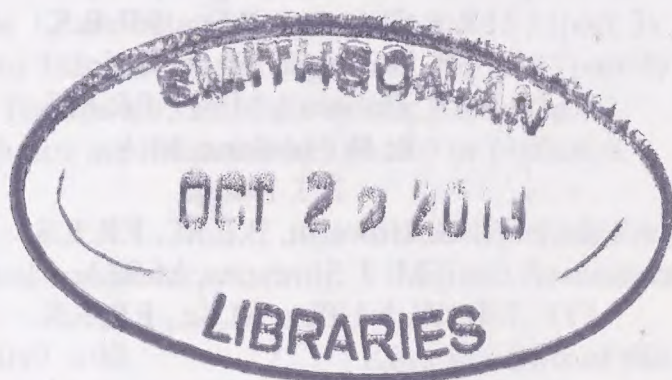


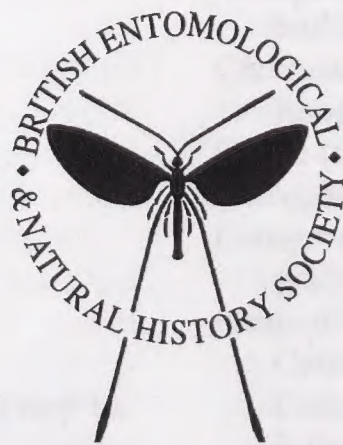
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Editor:

J. S. Badmin, H.F.R.E.S.
Coppice Place
Perry Wood
Selling
nr Faversham
Kent ME13 9RB
Tel: 01227-752291
email: jbadmin@btinternet.com

Editorial Committee:

D. J. L. Agassiz, M.A., Ph.D., F.R.E.S.
R. D. G. Barrington, B.Sc.
P. J. Chandler, B.Sc., F.R.E.S.
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R. W. J. Uffen, M.Sc., F.R.E.S.

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THE FIRST OCCURRENCE OF LARVAE OF THE BOX TREE MOTH, *CYDALIMA PERSPECTALIS* (LEPIDOPTERA: CRAMBIDAE) IN PRIVATE GARDENS IN THE UK

A. SALISBURY¹, A. KORYCINSKA² & A. J. HALSTEAD¹

¹Entomology, Royal Horticultural Society's Garden, Wisley, Nr Woking, Surrey, GU23 6QB

Email: advisory_entomology@rhs.org.uk

²Food and Environment Research Agency, Sand Hutton, York YO41 1LZ

Email: anastasia.korycinska@fera.gsi.gov.uk

ABSTRACT

The box tree moth *Cydalima perspectalis* (Walker) is a native of East Asia that has recently become established in mainland Europe. The caterpillars of the moth defoliate box (*Buxus*) plants. Adult moths have been recorded in parts of England since 2008 and larvae have been reported at one commercial nursery in 2008 and 2009. In 2011 caterpillars of the moth were found in private gardens in South East England for the first time. Available reports of the moth are presented and its potential effect on ornamental and native *Buxus* plants discussed.

INTRODUCTION

The box tree moth *Cydalima perspectalis* (Walker) (Plate 1, Fig. 1) feeds primarily on box (*Buxus* spp., Buxaceae) and is native to East Asia (China, Republic of Korea and Japan) (Mally & Nuss, 2010). In mainland Europe *C. perspectalis* was first reported from Germany in 2007, although it may have been present since 2005 (EPPO, 2008; Krüger, 2008; van der Straten & Muus, 2009). *Cydalima perspectalis* has since become widespread in northern Germany (EPPO, 2010a). It reached Switzerland in 2007 where it has spread rapidly (Leuthardt, Billen, & Baur, 2010), the Netherlands and France in 2008 (van der Straten & Muus, 2009; EPPO, 2010a), and Austria in 2009 (EPPO, 2010b).

In the UK an adult *C. perspectalis* was first recorded (in a light trap) in September 2008 from Weybridge, Surrey (Mitchell, 2009) and adults had been reported on ten occasions from southern England by the end of 2010 (Fish & Reeves, 2010, M. Parsons pers. comm., 2011). Larvae have been recorded on two occasions, September 2008 and 2009, in the UK at a plant nursery in Surrey (unpublished Food and Environment Research Agency (Fera) data). In May 2011 the Royal Horticultural Society (RHS) received the first report of caterpillars in a UK private garden at Stoke Poges, Bucks; two further records of the caterpillars were received by the RHS in 2011. These records are presented below and the current status of *C. perspectalis* in the UK is discussed, along with its biology and the damage it is likely to cause to its host plants in the UK.

DISTRIBUTION AND CONFIRMED BREEDING IN THE UK

Subsequent to the first record *C. perspectalis* occurred on two further occasions in September 2008 in East Sussex (Mitchell, *loc.cit.*). Adults were also recorded in 2009 and 2010 from South Essex, East Kent, Buckinghamshire, South Gloucestershire and Hertfordshire (Table 1, Fig. 1). Prior to 2011 larvae had been detected at a commercial nursery in Surrey on two occasions (ix/2008 and ix/2009; Fera data). In May 2011 the RHS received a verbal description of *C. perspectalis* caterpillars feeding on *Buxus* sp. from Stoke Poges, Bucks., the first record of larvae in a private garden in the UK. The Plant Health and Seeds Inspectorate (PHSI) collected and

Table 1. Records of the box tree moth, *Cydalima perspectalis* from the UK.

Location	10 km	Date(s)	Notes
Weybridge, Surrey ¹	TQ05	04/ix/2008	Adult, to light
Icklesham, E. Sussex ²	TQ81	23 & 24/ix/2008	Adults, to light
Leigh-on-Sea, Essex ³	TQ88	18/ix/2009	Adult, to light
Biddenden, Kent ^{4,5}	TQ83	21/ix/2009	Adult, to light
Densole, Kent ⁴	TR24	13/vii/2010	Adult, to light
Stoke Poges, Bucks. ^{4,6}	SU98	11 & 26/vii/2010	Adults, to light
Bishop's Stortford, Herts. ²	TL45	08/viii/2010	Adult, to light
Bristol, S. Glos. ^{4,6}	ST67	08/x/2010	Adult, to light
Woodford Green, S. Essex ⁷	TQ49	22 & 24/vi/2011	Adults
Commercial nursery, Surrey ⁶		ix/2008	1 larva, 3 pupae (1 empty)
Commercial nursery, Surrey ⁶		ix/2009	3 larvae, 8 pupae
Stoke Poges, Bucks. ⁸	SU98	17/v/2011	45 larvae, two pupae
Nr Harlow, Herts. ⁸	TL41	25/v/2011	Two larvae
Buckhurst Hill, S. Essex ⁸	TQ49	23/viii/2011	Two larvae

Sources: 1, Mitchell, 2009; 2, Fish & Reeves, 2010; 3, Tunmore & Hill, 2009; 4, M. Parsons *pers. comm.*; 5, S. Broyd, see postscript to Bailey, 2010; 6, Fera; 7, R. Barfoot *pers. comm.*; 8, RHS.

sent 45 larvae and two pupae to the Fera laboratory where the identity was confirmed. Caterpillars of *C. perspectalis* were reported to the Royal Horticultural Society on two additional occasions in 2011; two caterpillars were brought to the RHS Chelsea Flower Show, from Gilstone Park, Hertfordshire (25/v/2011) and two caterpillars from a garden in Buckhurst Hill, South Essex (23/viii/2011). On both occasions, these were likely to have been samples from larger infestations. A report of adult moths was also received from Woodford Green, South Essex on 23 and 24 June 2011 (R. Barfoot, *pers. comm.*).

SYNONYMY & IDENTIFICATION

The currently accepted name for the box tree moth is *Cydalima perspectalis* (Walker, 1859) (Mally & Nuss, 2010), although it has been placed in a number of genera since its arrival in Europe, including *Glyphodes*, *Neoglyphodes*, *Palpita* and, most commonly in the UK, *Diaphania* (Korycinska & Eyre, 2011).

The following description of the different life stages and damage is taken from Korycinska & Eyre (2011). The typical form of the adult (Plate 1, Fig. 1) has a wingspan of approximately 40 mm, the wings have a thick, faintly iridescent, golden dark brown border of uneven width around the edges of both pairs of white-coloured wings, the white parts being tinged with purple. The head is dark brown, thorax white anteriorly brown, abdomen largely white but its posterior end dark brown. A less common colour variant has completely brown wings, except for a small white streak on the forewing about half way along the front edge.

The eggs are laid in a flat sheet, overlapping each other, on the underside of box leaves. When first laid, they are pale yellow, but as they mature, the eggs develop a black spot where the larval head capsule is forming.

Newly hatched larvae are coloured greenish yellow, with black heads. As the larva develops the head remains black and the green body develops dark brown stripes. Mature larvae reach a length of up to 40 mm and retain a yellowish green ground colour, but develop a pattern of thick black and thin white stripes along the length of the body, with large black dots outlined in white on the dorsal surface (Plate 1, Fig. 2).

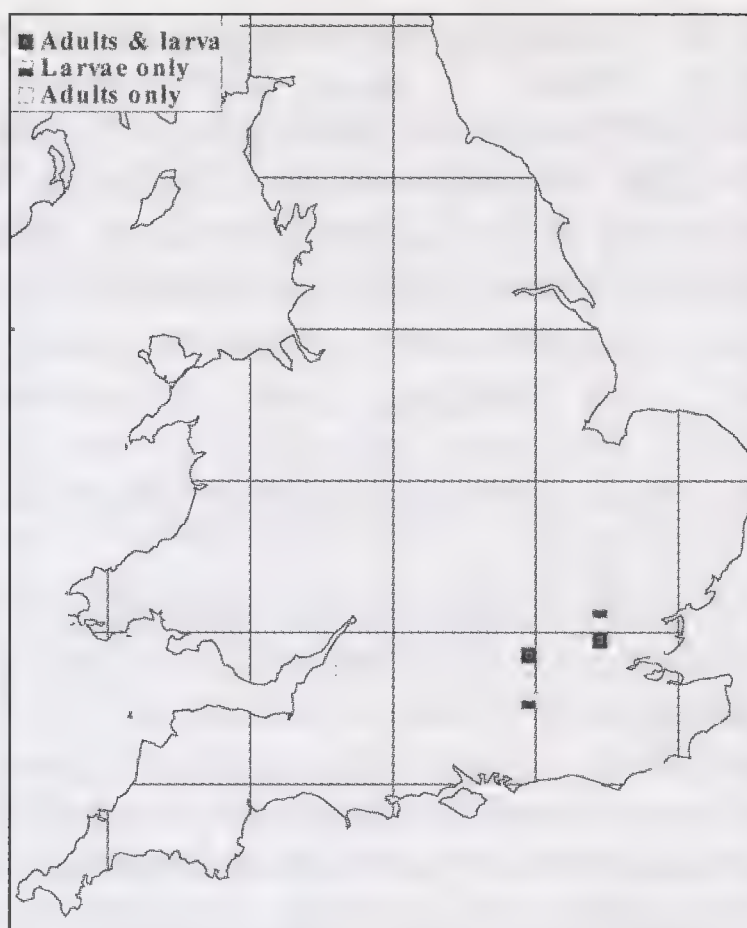


Fig. 1. Records of the box tree moth, *Cydalima perspectalis* (Walker) in England, September 2008 to October 2011. © RHS, Fera, M. Parsons (*pers. comm.*) and published data. Produced using Dmap©.

First instar larvae feed by ‘windowing’, eating the lower surface of leaves only and leaving the upper epidermis intact. Older larvae feed inside silk webbing and skeletonise the leaves of host plants, leaving only the midribs, and occasionally the outer margin, intact. Webbing, frass and moulted black head capsules may also be apparent.

The clearest evidence of *C. perspectalis* is the damage it causes to *Buxus* plants, which become disfigured by the loss of leaves and the presence of webbing spun by the larvae; this is especially apparent on trimmed plants (e.g., hedges and topiary).

The pupae are concealed in cocoons of white webbing spun among the foliage on the host plant. The pupae are between 15 and 20 mm long; they are initially green with dark stripes on the dorsal surface but older pupae turn brown.

A joint press release issued by the RHS and Fera in July 2011 (RHS, 2011), alerting the media to the presence of *C. perspectalis* resulted in several articles in national newspapers and garden magazines. Twenty-one suspected cases of *C. perspectalis* were reported to the RHS, though all but two of these enquiries related to various yellow and black caterpillars feeding on plants other than *Buxus*, ruling out *C. perspectalis*. Those enquiries where the caterpillars were identifiable, included within the Lepidoptera, large white (*Pieris brassicae* (L.), Pieridae, four enquiries), mullein moth (*Shargacucullia verbasci* (L.), Noctuidae, three enquiries), toadflax brocade (*Calophasia lunula* (Hufnagel), Noctuidae, two enquiries), buff tip (*Phalera bucephala* (L.), Notodontidae, two enquiries), lackey moth (*Malacosoma neustria* (L.), Lasiocampidae, one enquiry) and within the Hymenoptera, berberis sawfly (*Arge berberidis* Schrank, Argidae, one enquiry).

LIFECYCLE AND HOSTS

In Europe, *C. perspectalis* larvae have so far been observed feeding on five taxa of box (the species *Buxus microphylla* Siebold Zuccarini, *B. sempervirens* L. and *B. sinica*

Rehder & Wilson, and the cultivars *B. sinica* var. *insularis* and *B. sempervirens* ‘Rotundifolia’) (Leuthardt, Billen, & Baur, 2010). There is some evidence of differences in susceptibility of hosts, with the cultivar *B. sempervirens* ‘Rotundifolia’ possibly less susceptible than *B. sempervirens* (Leuthardt, Billen, & Baur, 2010). Experimentally, *B. microphylla* provided the best larval growth rate at a range of temperatures (Maruyama, 1993). In Asia other reported hosts include purple-leaved holly (*Ilex purpurea* Hassk, Aquifoliaceae), Japanese spindle (*Euonymus japonicus*, Thunberg, Celastraceae), and burning bush (*Euonymus alatus* (Thunberg)), (Korycinska & Eyre, 2011). However, unpublished tests by the Plant Protection Service of the Netherlands have produced negative results with these hosts (van der Straten & Muus, 2009).

The biology of *C. perspectalis* in Europe has not been studied in detail. In south west Germany and Switzerland, there are probably two or three generations between May and September (Leuthardt, Billen, & Baur, 2010). In China three to five generations a year have been noted (Tang, Qin, & Sun, 1990), and Japanese populations in the Tokyo area have three generations a year (Maruyama & Shinkaji, 1987). Studies in Japan indicate that there are typically six larval instars and that larval development takes approximately 23 days at 25°C (Maruyama & Shinkaji, 1991). *Cydalima perspectalis* overwinters as first, second or third instar larvae, which shelter between two leaves bound together with silk in autumn, and they complete their development the following spring (Maruyama & Shinkaji, 1991). One of the caterpillars received by the RHS on 25/05/2011 pupated on 29/05/2011, emerging as an adult after 18 days at room temperature (24°C ± 5°C, and a natural daylight cycle). The presence of larvae in the UK in both late spring and late summer 2011 indicate that it is possible that two generations of *C. perspectalis* occurred in 2011.

Adults of both sexes of *C. perspectalis* are capable of flight but its natural dispersal capabilities are not thoroughly known (Korycinska & Eyre, 2011). In Germany it has been found to be spreading at 5–10 km a year (van der Straten & Muus, 2009).

DISCUSSION

It is clear that *C. perspectalis* is becoming established in the UK. It is thought that the pathway of introduction of *C. perspectalis* into Europe was trade in commodities from East Asia, possibly as a stowaway with granite stones (Leuthardt, Billen, & Baur, 2010; Korycinska & Eyre, 2011). Eggs, diapausing larvae and pupae are all associated with *Buxus* foliage and are difficult to detect, hence trade in box plants may explain some of the moth’s dispersal in Europe. Infested plants have been found on sale in garden centres around Basel (Leuthardt, Billen, & Baur, 2010) and plant trade is a possible mode of entry into the UK (Korycinska & Eyre, 2011). It is also possible that the moth entered the UK naturally through migration from continental Europe; the proximity to the southern coast of England of some records may indicate that this was the mode of entry for at least some adult moths. Due to the likelihood of natural introduction from Europe no further statutory action against this insect is being taken by Fera (Korycinska & Eyre, 2011).

The presence of *C. perspectalis* in the UK is likely to have an effect on ornamental plantings in gardens and parks. The defoliation and dieback are unsightly, and reduce the amenity value of the plants. However, also of concern is potential damage to the uncommon native box plants (*B. sempervirens*) found in parts of southern England, notably on Box Hill, Surrey. *Cydalima perspectalis* has caused serious damage to native *B. sempervirens* plants in Switzerland (M. Kenis pers. comm., 2011).

ACKNOWLEDGEMENTS

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SHORT COMMUNICATION

The 13-spot ladybird, *Hippodamia tredecimpunctata* (L.) (Col.: Coccinellidae) – a larval record from Britain. – This has always been a scarce species in Britain, owing its status as a native species largely to a series of records in the 19th and early 20th centuries (Roy *et al.*, 2011). These included specimens as far inland as Oxford and Durham, but sightings became scarcer and the species was thought to have become extinct in Britain around 1950. However, the species continued to thrive on the continent, and between 2002 and 2010 a dozen sightings of adults along the south coast were reported to the national recording scheme, some of multiple beetles (UK Ladybird Survey, via the NBN Gateway, Roy *et al.*, 2011). These were presumed to result from immigration, but also included two specimens in Cornwall reported to be teneral when found (Paul Gainey, via the UK Ladybird Survey).

The ladybird is a specialist of wet grassland and marshy, humid areas, so suitable habitat is likely to be present along the south coast. The species is thought to be resident in Ireland (Speight, 1990), so with the recent increase in migrant activity, it seemed likely that it was a matter of time before *H. tredecimpunctata* re-established itself somewhere along the south coast of Britain (Roy *et al.*, 2011).

On the 31 July 2011, the authors attended a BioBlitz event at the Axe Estuary Wetlands, near Colyford (SY251918). These are intensive field surveys involving both experts and members of the public, with the aim of recording as many as possible of the species within an area (<http://www.amentsoc.org/insects/glossary/terms/bioblitz>).

A single fourth instar larva of *H. tredecimpunctata* was swept from a *Juncus* sp. tussock, which appears to be the first record of a juvenile of this species from Britain. The larva was taken into captivity to rear through, where it was reared on a diet of pea aphids, *Acyrtosiphon pisum* (Harris), pupating on the 15 August and emerging on the 23rd. Two repeat visits to the reserve have also found the species; two adults on the 1 September and a single individual on the 17 November. Also present were large numbers of the water ladybird, *Anisosticta novemdecimpunctata* (L.), 16-spot ladybird *Tytthaspis sedecimpunctata* (L.), and the inconspicuous ladybirds *Coccidula rufa* (Herbst) and *Rhyzobius litura* (Fabr.).

Despite a considerable amount of time spent sweep-netting suitable vegetation on all three site visits, *H. tredecimpunctata* individuals were only found in a small area of the marsh. Consequently, this appears to be a very small, local population, possibly the result of a single ovipositing female. – RICHARD F. COMONT, Centre for Ecology & Hydrology, Crowmarsh Gifford, Oxon, OX10 8BB & CATHARINE WILLERTON, 6 The Orchard, Seaton, Devon EX12 2RW.

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THE DISTANCE AT WHICH FLYING INSECTS ARE DETECTED AS THEY APPROACH SWARMING *EPISYRPHUS BALTEATUS* (DIPTERA: SYRPHIDAE)

JOLYON ALDERMAN

*Landscape and Biodiversity Research Group, School of Science and Technology,
University of Northampton, Newton Building, Avenue Campus, Northampton NN2 6JD
email: jolyon.alderman@northampton.ac.uk*

ABSTRACT

If swarming is a mating function in some of the Diptera, then those flies which do so will require a high level of visual acuity to enable both the detection and interception of approaching potential mates. To investigate just how well swarming flies can see, it was decided to measure the visual acuity of male *Episyrphus balteatus* (De Geer) using video recordings and a moving model as two contrasting approaches. The results were statistically similar, with *E. balteatus* having greater visual acuity than foraging insects, but less than those that defend sole-occupancy territories. As confirmation that the visual ability of insects is a combination both of the physical elements of the compound eye and neurological processing, visual acuity was seen to reduce in windy conditions and a conditioning effect was observed whereby repeated movements were ignored. As motion also forms a component of visual acuity, the opportunity to record approach and interception velocities was also taken.

INTRODUCTION

Swarming in Diptera is generally considered to be a mating function (Downes, 1969), with one gender, usually the males, doing the swarming and the opposite gender being attracted to the swarm (Thornhill, 1976; Blackwell *et al.*, 1992; Svensson & Petersson, 1992; Gullan & Cranston, 2005). Usually formed in fixed locations, often referred to as leks, there is an almost certain probability that other insect species (heterospecifics) will also approach the swarm. If mating is to take place, the ability to visually recognise and intercept approaching insects is essential. To avoid wasting energy on unproductive interceptions, being able to identify those approaching insects most likely to be an individual of the same species (a conspecific) would be a definite advantage.

Behaviour in the field is determined by the ability to detect a single object which is related to that behaviour, such as flowers for foraging insects and invertebrates for predating insects, against the expected background, such as vegetation for woodland swarming insects. Using one of the most widespread and abundant British hoverflies as an example, it is reasonable to assume that swarming male *Episyrphus balteatus* (De Geer) would have evolved to react to what at least appears to be an approaching female. As the approaching insect draws closer, the image will grow larger in the eye of a male in the swarm and at a set distance, a reaction response will occur. The minimum angle subtended at a swarming male *E. balteatus* eye by an approaching conspecific at the distance at which that reaction response occurs is in this study referred to as the detection angle (but is also known as the single object threshold (cf. Land, 1997)). This paper describes two contrasting approaches to measuring that angle.

Two interesting aspects of swarming behaviour are the velocity at which an insect approaches the swarm and the velocity of any subsequent interception flight (or

chase) by a responding male (Collett & Land, 1978). The opportunity was therefore taken to record the velocity of flying insects which triggered a chase, together with the resultant interception velocity of the chasing male. It should be noted, however, that the main objective of this study was to investigate the initiation of a reaction to an approaching insect of the same species, rather than the response itself and further elements of interception behaviour, such as eye structure and flight patterns, were not considered.

METHODS

During initial observations, it was noticed that even a small movement made by the observer or another flying insect when close to a swarm would cause individuals in that swarm to react with a small movement upwards and away from the source of the movement. This behavioural characteristic, here referred to as the reaction response, was used as a signal that an observed *E. balteatus* had reacted to what it perceived as an approaching insect.

If the reaction response distance can be measured, then given the limited length of *E. balteatus* of 9–12mm (Van Veen, 2004), the detection angle of swarming male *E. balteatus* can be calculated. To determine this angle, two contrasting field-based approaches were adopted. The first was an observational technique, using video recordings to measure the reaction response distance as an insect approached a swarm of *E. balteatus*. The second was an experimental approach, which used a moving target to measure the furthest distance from a swarm of *E. balteatus* at which a reaction response could be induced. If similar detection angles were obtained from the two different approaches, the result should reflect the actual detection angle.

Study Areas

The study was undertaken mainly in Delapre Woods (SP755582), with a few observations from Yardley Chase (SP851542). Delapre Woods is a 15ha mixed woodland located on the southern boundary of Northampton (VC32). The wood contains oak (*Quercus* sp.), sweet chestnut (*Castanea sativa*), sycamore (*Acer pseudoplatanus*), beech (*Fagus sylvatica*) and various conifers, together with significant amounts of standing and fallen deadwood. Yardley Chase is a much larger wooded area that lies to the south of Yardley Hastings (VC32), with the area used for this study containing mostly ash (*Fraxinus excelsior*), oak (*Quercus robur*), field maple (*Acer campestre*), hawthorn (*Crataegus* spp.) and hazel (*Corylus avellana*).

Study Species

Episyrphus balteatus is found in the UK throughout the year, with the main season running from May through to September (Dean, 1982; Chambers *et al.*, 1986; Ball & Morris, 2000). Males commonly form aerial swarms in woodland clearings, where they are easily observed (cf. Alderman, 2008). Coupled with the species' long flight period, this makes *E. balteatus* an ideal subject for studying swarming behaviour.

Observational Approach

The observational approach employed a tripod-mounted Sanyo Xacti VPC-CG20 video recorder set to record swarming behaviour at 30 frames per second. To provide an accurate indication of scale, a measuring stick marked in 100mm divisions was placed in shot at the same distance from the camera as the centre of the swarm. In this manner, 32 swarms were visited in total: two in Yardley Chase (4th July 2011)

and 30 in Delapre Woods (5th July 2011). To make the subsequent analysis a reasonable task, the video footage of each swarm was limited to approximately two minutes. To ensure that the flies were visible and to remove any effects of air movement, the recordings took place when the swarms were in sunshine and on days when there was no wind. As *E. balteatus* is highly mobile (Aubert, Goeldlin & Lyon, 1969), the swarms were visited as quickly as possible with the aim of reducing the chance of recording the same individuals more than once. The videos were replayed frame by frame to record the distance (using the measuring stick) at which an approaching insect caused one of the swarming *E. balteatus* to react and give chase. The same approach was used to calculate the approach velocity of the insect triggering the reaction and the resultant interception velocity of the observed *E. balteatus*.

Experimental Approach

The experimental approach involved recording the maximum distance at which an *E. balteatus* simulator elicited a reaction response from a member of an *E. balteatus* swarm. The simulator included a rotatable rectangular piece of cardboard to model a moving *E. balteatus*. There is a distinct risk with this type of approach in that the presence of the model operator, rather than the model itself, could influence the behaviour of the swarm. To reduce this risk, the *E. balteatus* model measured 78mm × 22mm, to match the length to width ratio of an average female *E. balteatus* but which at the same time was large enough to elicit a reaction response at a safe distance. Details of the *E. balteatus* simulator are given in Figure 1.

Starting at a distance from the swarm which failed to induce a reaction, but at which individuals could still be seen, the simulator was operated at successively closer distances until a reaction response was observed. The operation comprised one

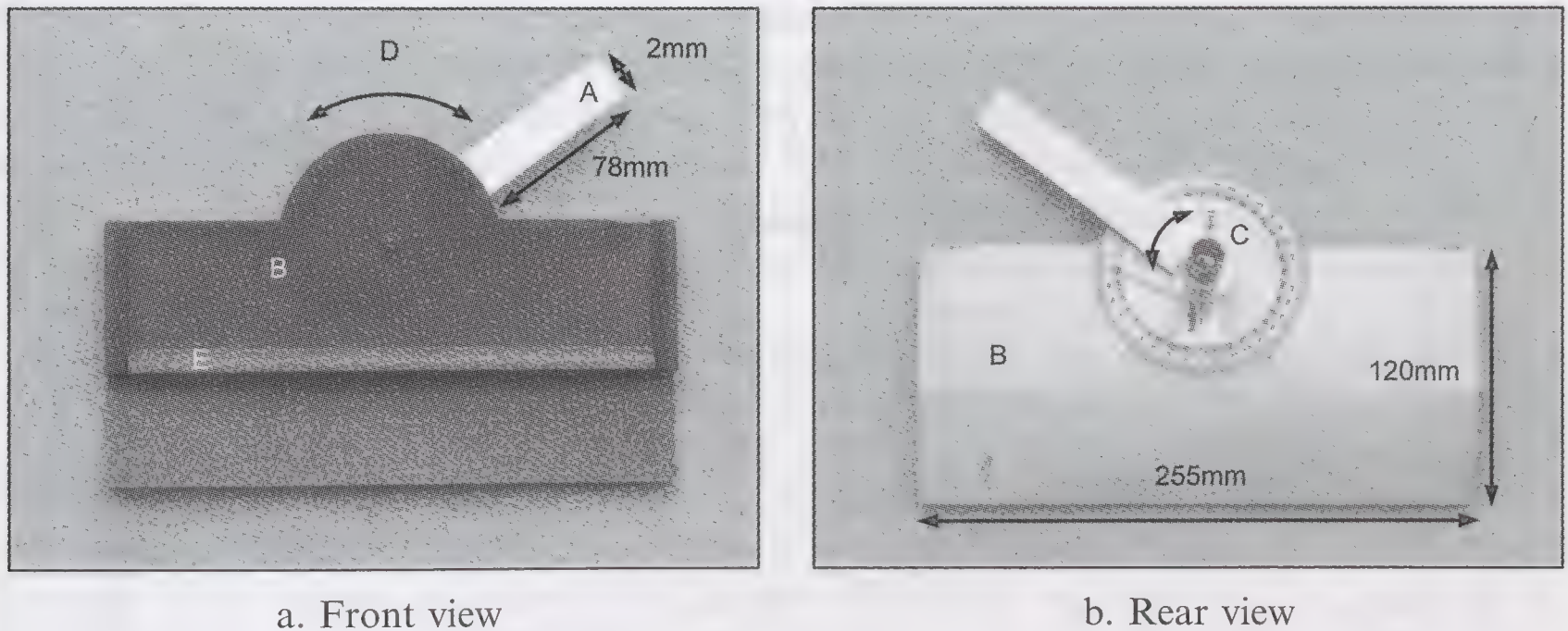


Fig. 1. The *E. balteatus* simulator, showing (a) the front view as seen by the swarm, with the model *E. balteatus* (A) shown partially rotated and (b) the rear view as seen by the operator. A 360° protractor with a rotatable pointer was fixed to a shaped sheet of cardboard (B). To make operation easier, a 35mm length of garden hose was inserted into the pointer's knurled knob (C). Rotating the length of hose made the model visible from the swarm through 180° (D). The shaped sheet was strengthened with small strips of wood (E) and painted mottled green to blend into the background. The model was painted white as a high reflectance colour for maximum effectiveness (Vrdoljak & Samways, 2011). The reason behind the size of the model is described in the text.

rotation of the model 180° clockwise followed by another rotation 180° anti-clockwise, such that the model was visible from the swarm as two flashes. To preserve the contrast of the model, a green jumper or jacket was worn when operated. In this manner, the reaction response distance was recorded for 61 swarms: 58 in Delapre Woods (17th July 2011) and three in Yardley Chase (25th July 2011). The distances were measured in boot lengths, which in the operator's case was a convenient 300mm. It was noticed that once detected, the swarms became conditioned to repeated rotations of the model which made further measurements unreliable at that time and the procedure was therefore only carried out once per swarm. It was also noticed that the reaction distance was far less during windy conditions, presumably due to movement of the surrounding vegetation. To remove any effects of air movement, the experiments were therefore undertaken on windless days. As with the video recordings, swarms were visited as quickly as possible, as a measure to reduce the chance of recording the same individuals more than once.

RESULTS

Reaction Response Distances and Detection Angles

The observational study generated approximately 65 minutes of recorded behaviour and in all but two instances, the approaching insects were male *E. balteatus* joining the swarms. Analysis of the recorded behaviour revealed that approaching *E. balteatus* triggered a reaction response at a median distance of 344mm from a swarming *E. balteatus*. Taking 10.5mm as the length of a typical *E. balteatus*, this resulted in a median observed detection angle of 1.75°. For the experimental approach, the median reaction response distance from 61 swarms was 2700mm. Using the model length of 78mm, this resulted in a median experimental detection angle of 1.66°. The results are given graphically in Figure 2. A large-sample Mann-Whitney U test revealed there was no significant difference at $\alpha = 0.05$ between the observed and experimental detection angles ($Z = -1.455$, $P = 0.147$).

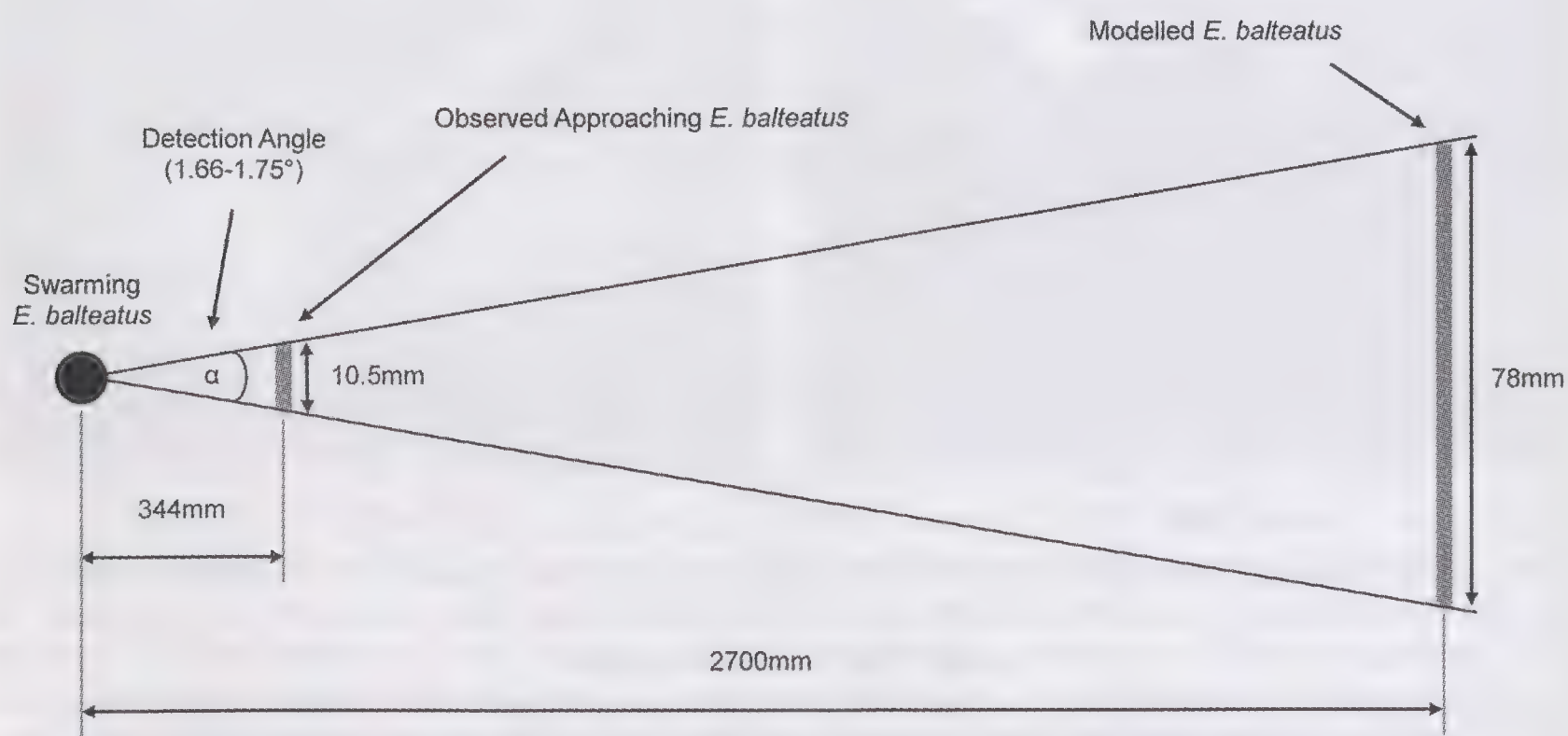


Fig. 2. The combined observational and experimental reaction response distances showing the relative positions of swarming, approaching and modelled *E. balteatus*. The median reaction response distances to approaching conspecifics and the model were 344mm and 2700mm respectively, indicative of optical detection angles of (α) of 1.75° and 1.66°, respectively.

Approach and Intercept Velocities

The video recordings were used to measure the velocities of approaching flying insects and the resultant interception velocities of swarming male *E. balteatus*. This was accomplished by calculating the distance moved in one frame, based on the recording rate of 30 frames per second. The median intercept velocity from nine swarms was 3.4m/s and the median conspecific (other *E. balteatus*) approach velocity from 10 swarms was 3.3m/s. The only approaching insects other than *E. balteatus* were two flies, a large one detected at 450mm and moving at 1.2m/s, and a smaller one detected at 160mm and moving at 6m/s. As a comparison with the observations, the tip of the model rotated at approximately 1.47m/s.

DISCUSSION

The compound eyes of insects are realised in several forms, such as the apposition eyes of bees, the neural superposition eyes of flies, optical superposition in moths and afocal apposition in butterflies (cf. Land, 1997; Land *et al.*, 1999). (The book 'Animal Eyes' by Land & Nilsson (2010) provides a useful introduction to the structure and function of the known types of eyes.) This disparity in eye structure suggests that visual systems in flying insects are likely to be tuned to a particular requirement, as can be seen with the contrasting examples of individual territorial defence and foraging. Flying insects tend to pass through, rather than be attracted to the individual territories of other flying insects. To both maximise the chance of mating and to defend a territory, the territory holder needs to detect such insects from a distance and to challenge any that appear to be of the same species (i.e. a conspecific). This type of activity requires a high level of visual acuity. Schultz & Switzer (2001), for example, found that males of the territorial amberwing dragonfly *Perithemis tenera* (Say) detected conspecifics at approximately 2.5m, which corresponds to a minimum detection angle of approximately 1°. From their study into detection neurons, Nordström & O'Carroll (2006) suggested that the hoverfly *Eristalis tenax* (L.) could detect a conspecific at 1.1m, which corresponds to a detection angle of 0.8°. On the other hand, anthophilous insects, such as bees, generally seek larger, static targets such as flower heads, and a lower visual acuity should suffice. In a foraging experiment, Spaethe & Chittka (2003) found that the bumblebee *Bombus terrestris* (L.) required a minimum angle of 3.5°–7.8° to detect a target. In field trials, the honeybee *Apis mellifera* L. required a minimum angle of 5° (Giurfa *et al.*, 1996).

Swarming insects hold a communal territory (the lek). As with individual territory defenders, swarm members both detect and chase intruders, but unlike territory defenders they have to contend with many nearby conspecifics. Whilst the advantage of a swarm may be that it attracts the opposite gender (cf. Sullivan, 1981), there is the ever present danger of spending too much time and hence wasting energy through chasing other swarm members. With the conflicting requirements of needing to detect and react to conspecifics but also having to avoid spending too much time chasing each other, swarming insects may therefore be expected to have a visual acuity less than individual territory defenders but greater than that of foraging insects. The results of this study suggest that, at least for *E. balteatus*, this is indeed the case, with statistically similar detection angles of 1.75° and 1.66° arising from the observational and experimental approaches respectively (Figure 2).

The observed median reaction response distance of 343mm may seem a little short (Figure 2). A greater reaction distance, with a correspondingly smaller detection angle, would result in earlier detection but the trade-off would be more time spent

chasing other swarm members and/or the swarm having to spread out over a larger area to reduce inter-swarm activity. If the swarm spreads too far, then at some point it ceases to be one, females would not be attracted to it and swarm members would become individual territory defenders. Male *E. balteatus* typically spend approximately 12% of their time at a lek chasing other members of the swarm (Alderman, 2008), which does not seem too great a burden, and the recorded reaction distance is presumably an acceptable compromise between these conflicting requirements. The two recorded heterospecifics also initiated a reaction response, with the larger one being detected further away (450mm) and the smaller one closer (160mm) than the conspecific reaction distance, both presumably matching the conspecific detection angle. This suggests that *E. balteatus* will react to any approaching flying insect which draws close enough to realise the conspecific detection angle.

Insects which rely on vision to recognise and react to a particular situation do so using a combination of the physical attributes of their compound eyes and neurological processing of the received visual signals to instigate an appropriate behavioural response (Buschbeck & Strausfeld, 1997; Matthews & Matthews, 2010). Examples include territorial behaviour in dragonflies (Switzer & Eason, 2000), navigation in leaf-cutter bees (Fauria, Campan & Grimal, 2004) and distance determination in praying mantids (Hyden & Kral, 2005). In the case of *E. balteatus*, it was obvious that more than just visual recognition was playing a part in their behaviour. Although the model elicited the same initial reaction response as a real approaching conspecific, an interception was not initiated. Presumably due to the model not actually approaching the swarm, this intimates that a potential conspecific has to be both detected and registered as increasing in size (i.e. approaching) before an interception is attempted. Further evidence of neurological processing was revealed during the early stages of the experimental approach when it was noticed that swarming *E. balteatus* exhibited a conditioning effect, whereby the model was ignored after three to four operations. This suggests that the species filters out or remembers any similar repeated movements that do not turn out to be an approaching conspecific and ignores them.

Velocity causes blurring of images, with an adverse effect on visual acuity (Land, 1997), but relatively little seems to have been published on velocity in relation to single object detection. One exception is Nordstrom & O'Carroll's (2006) study into detection neurons in which they suggest that *E. tenax* could detect conspecifics flying at velocities up to 4m/s. The results from this study suggest that male *E. balteatus* can detect conspecifics approaching at a velocity of at least 3.3m/s and can match that rate when intercepting them. Male *E. balteatus* also responded to the model moving at 1.47m/s and to two heterospecifics approaching at 1.2 and 6m/s, which gives an idea of the range of velocities that the species responds to. Further exploration of approach and interception velocities was left as a matter for another day.

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SHORT COMMUNICATION

Issus muscaeformis (Schrank) (Hemiptera: Issidae) in Cornwall. – Whitehead & Key (2010) have recently shown that *Issus muscaeformis* – far from being a specialty of the Morecambe Bay Limestone area of Westmorland and North Lancashire (VC69) – actually has a classic northern and western distribution in Britain. They report its presence at single localities in North Wales (VC48: Hafod Garregog) and South Wales (VC35: Usk), as well as a site in Cornwall. The previously unpublished Cornish record is of an adult female found at Stowe Woods (VC2; SS21) by P Kirby on 11.ix.1985.

The new observations – and especially the excellent illustrations by RSK – make the separation of the two species much more straightforward. Consequently the author's own single specimen of a Cornish *Issus* has now been re-examined and proves to be another *I. muscaeformis*. This specimen was taken in Ethy Woods (VC2; SX15), 13.vii.2001 (Alexander, 2008). Interestingly the only other Cornish *Issus* record comes from the old Victoria County History (Clark, 1906): Pencalenick (SW84). All three sites are characterized by ancient oak coppiced woodland on steep slopes above coastal river valleys and it seems reasonable to assume that the old record similarly relates to *I. muscaeformis* rather than *I. coleoptratus* – at least until a voucher can be traced. The other British sites for *I. muscaeformis* are also described as mixed oak woodland, while foodplants listed include oak, sycamore and ash in Britain and hornbeam and hazel on the continental mainland (Nickel, 2003; Whitehead & Key, 2010). *Issus coleoptratus* is best known in Britain from ivy although it has also been found on a wide range of other woody species.

Following the realization that *I. muscaeformis* occurs in SW England, samples of *Issus* found locally have subsequently been retained on every encounter and subjected to close examination. All have proved to be *I. coleoptratus*, covering the width of Devon from Beer (SY28) in the east, through Bridford (SX88), Chudleigh Knighton (SX87) and Torbryan (SX86), and as far west as Plymouth (SX45). *I. muscaeformis* is clearly a rare element of the local fauna – the entry for *I. coleoptratus* in the Cornish Red Data Book (Alexander, 2009) needs to be changed to *I. muscaeformis*. – KEITH N. A. ALEXANDER, 59 Sweetbrier Lane, Heavitree, Exeter EX1 3AQ.

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SCALE INSECTS AND WHITEFLIES (HEMIPTERA: COCCOIDEA AND ALEYRODOIDEA) OF WATSONIAN KENT; WITH A DISCUSSION ON THE IMPACT OF NATURALISED NON-NATIVE SPECIES

C. MALUMPHY¹ & J. S. BADMIN²

¹*The Food and Environment Research Agency, Sand Hutton, York YO41 1LZ, UK*
Email: chris.malumphy@fera.gsi.gov.uk

²*Coppice Place, Perry Wood, Selling, nr Faversham, Kent ME13 9RP*

ABSTRACT

An annotated list of 79 species of Coccoidea (37 native, 16 naturalised introductions, 17 introduced species established on indoor plantings and 9 non-established introductions on growing plants), and 17 species of Aleyrodoidea (five native, six naturalised introductions, two introduced species established on indoor plantings and four non-established introductions on growing plants), recorded from Watsonian Kent is presented. The mealybug *Balanococcus kwoni* Pellizzari & Danzig, an Asian pest of bamboo, is recorded from Britain for the first time. Eleven species of scale insect and seven species of whitefly are recorded outdoors from Watsonian Kent for the first time. A third of all scale insect species and half the whitefly species found outdoors in Watsonian Kent are non-native introductions. None of the introduced species, however, appear to have any serious negative impact on native biodiversity, ecosystems, forestry or crops, although they do have an economic and aesthetic impact on ornamental plants in urban areas. *Diaspidiotus pyri* (Lichtenstein) has been recorded as an occasional, minor pest of apple; and the presence of non-native scales on ornamental plants has prevented the issuing of plant-passports for export. Naturalised non-native scale insect species are more abundant and frequently more damaging to ornamental plants in urban areas than native scale species. This is due in part to the frequency of non-native host plants in urban areas. The most common and widely distributed non-native species in urban areas are *Pulvinaria floccifera* (Westwood) and *P. regalis* Canard; both species also occur in rural areas but often at much lower densities.

INTRODUCTION

The purpose of this paper is to record the scale insects and whiteflies (Hemiptera: Coccoidea and Aleyrodoidea) found in Watsonian Kent (Vice Counties 15 (East) and 16 (West)), and to discuss the impact of naturalised non-native (alien) species in the county. Watsonian Kent is important for monitoring non-native insect introductions in England for several reasons including:

1. It is the closest county to continental Europe and species expanding their geographical range northwards in Europe, due to factors such as climate change and trade, might be expected to be detected in Kent early on during their establishment in Britain. Recent examples of non-native introductions, where the earliest or some of the earliest UK records were from Kent, include field maple whitefly *Aleurochiton acerinus* Haupt (Dolling & Martin, 1985), *Balanococcus kwoni* Pellizzari & Danzig (reported here), horse chestnut leaf-miner *Cameraria ohridella* Deschka & Dimić (Tilbury & Evans, 2003), cottony cushion scale *Icerya purchasi* Maskell (Watson & Malumphy, 2004), western

conifer seed bug *Leptoglossus occidentalis* Heidemann (Malumphy *et al.*, 2008) and aquilegia flower bud gall midge *Macrolabis aquilegiae* (Keiffer) (Halstead & Harris, 2011).

2. It is an important trade route into Britain, for example, via the Channel Tunnel, Kent International Airport Manston, Port of Dover, Port of Folkestone, Sheerness Docks and Thamesport. Kent is often referred to as the 'gateway to Britain'.
3. The climatic conditions in the county are milder than found in more northerly areas of Britain, and are more conducive for thermophilic non-native species to naturalise.
4. The north west of the county is occupied by part of Greater London (Bexley, Bromley, Greenwich, Lewisham and part of Newham), which acts as an urban heat island which may allow species that have previously been limited to warmer, more southerly latitudes, or those usually restricted to indoor plantings in northern Europe, to overwinter and breed outdoors.
5. Kent has a wide variety of habitats, including many protected semi-natural areas (English Heritage properties, Kent Wildlife Trust and National Trust sites, Kent Downs, Country Parks etc.), rich agricultural land, and the largest collection of fruit trees and plants in the World (Brogdale Farm, home of the National Fruit Collection). It is famous for its deciduous fruit orchards and is commonly referred to as 'The Garden of England'.
6. The fauna of Kent has been studied in more detail than most other counties of Britain, so the introduction of new pests can be more easily and accurately monitored.

Data on the scale insects and whiteflies of Watsonian Kent were obtained from published records, unpublished records (primarily from the Royal Horticultural Society (RHS) and the Natural Resources Institute (NRI)), specimens deposited at the Natural History Museum, London (NHM) and samples collected by the authors. The RHS records are based on samples submitted to the RHS Members' Advisory Service. A small number of samples were collected by the Plant Health and Seeds Inspectorate (PHSI) of the Department of Food and Rural Affairs (Defra) during statutory plant health inspections.

The study of the scale insect fauna of Watsonian Kent appears to have begun earlier (22 species collected before 1903, when Robert Newstead completed his monograph on the coccoids of Britain) and been more comprehensive than for perhaps any other county in Britain. The only other counties where the scale fauna have been intensively studied are Bedfordshire (VC 30) (Malumphy, 2010b), Berkshire (VC 22) (K. L. Boratynski and The Food and Environment Research Agency (Fera), unpublished data), Cheshire (VC 58) (Newstead, 1901, 1903; Fera, unpublished data), Surrey (VC 17) (several publications by Green and Williams; Fera and RHS, unpublished data) and Yorkshire (VC 61-65) (Malumphy, 2009b). John William Douglas was one of the earliest entomologists to study scale insects and whiteflies in Britain and recorded many species from the area surrounding his residence in Lewisham (VC 16) during the 1880s and 1890s. Ernest Edward Green was one of the most important British coccidologists (describing more new species (26) of scale insect from specimens collected in Britain than any other collector) and resided for a few years in the 1890s at Bearsted (VC 15). He recorded many rare mealybugs (Pseudococcidae) and felt scales (Eriococcidae) from Kent, particularly species that live on grasses and herbaceous plants. Professor Frederick Vincent Theobald, an eminent entomologist working at the South-Eastern Agricultural

College, Wye (VC 15), published a series of articles on pests of agricultural, horticultural and forestry importance, including many records of scale insects (identified by Newstead) found in Kent. The whiteflies of Kent have not been studied in so much detail and published records that are available are disparate. The availability of literature on British scale insects and whiteflies was reviewed briefly by Dolling (1991) and Malumphy (2010b).

Malumphy (2009b, 2010b) discussed the complication of compiling check lists of scale insects and whiteflies. The main factors being that these are among the arthropod groups most commonly dispersed between countries as a consequence of international trade, and non-native species are continually being accidentally introduced on imported plant material and occur as transient populations; scale insects are one of the most successful arthropod groups in terms of invading new geographical areas and many species have become cosmopolitan due to anthropogenic activities. Large numbers of non-native scale insect species have been intercepted by the PHSI on imported produce, such as citrus and mango fruit, and African leafy vegetables, at Kent International Airport Manston, Sheerness Docks and Thamesport. Those non-native species found only on imported produce are excluded from this work as they are unlikely to survive for long and their inclusion has little scientific value.

METHODS

Data on the scale insects and whiteflies of Kent were obtained from published records, the RHS, NRI, NHM slide depository and recent collecting by the authors, the PHSI and others. Only part of the NHM collections were examined (due to time constraints) and it is likely that there are specimens of scale insects and whiteflies found in Kent deposited at the NHM that are not listed below. Methods used for collecting, slide-mounting and identification follow Malumphy (2009b, 2010a, 2010b). Slide-mounted and some dry voucher specimens are deposited at the NHM and Fera. The nomenclature of scale insects used here follows Ben-Dov, Miller & Gibson (2010) and whiteflies follows Martin & Mound (2007). Morphological descriptions and keys for the identification of the majority of native and naturalised species of scale insects and whiteflies may be found in Kosztarab & Kozár (1988) and Martin, Misfud & Rapisarda (2000), respectively.

All specimens listed under 'Collection data' have been examined by the author, with the exception of some *Aleyrodes* samples.

RESULTS

COCCOIDEA – Scale insects

Seventy-nine species of Coccoidea are recorded (37 native, 16 naturalised introductions, 17 introduced species known to be established in the UK on indoor plantings and 9 non-established introductions on growing plants) from Watsonian Kent. Eleven species of scale insect are recorded outdoors for the first time from the county.

NATIVE AND INTRODUCED NATURALIZED SPECIES

ORTHEZIIDAE – ensign scales

Newsteadia floccosa (De Geer) – boreal ensign scale

Trans-Palaeartic; found among mosses, lichens and leaf litter, and the roots of a wide range of herbaceous and woody plants; locally common but rarely recorded in Britain.

Published record. VC 16: Bexley wood, 28.v., on grass stems and dead leaves (Douglas, 1881); Chislehurst (Newstead, 1903).

***Orthezia urticae* (L.)** – nettle ensign scale (Plate 2, Fig. 1)

Trans-Palaeartic; polyphagous on herbaceous plants and occasionally woody plants; locally common but rarely recorded in Britain.

Published record. VC 15: Bearsted, on *Potentilla*, *Ranunculus* and *Vicia*, ix.1927 (Green, 1928).

MONOPLEBIDAE – giant scales

***Icerya purchasi* (Maskell)** – cottony cushion scale (Plate 2, Fig. 2)

Present throughout the warmer parts of the world; broadly polyphagous; naturalized in Greater London where it is occasionally a serious pest (Watson & Malumphy, 2004).

Published records. VC 15: Maidstone, on *Citrus*, 10.xi.1999 (Watson & Malumphy, 2004). VC 16: Chislehurst, on *Citrus*, 5.ii.2001 (Watson & Malumphy, 2004).

RHS records. VC 16: Beckenham, on *Acacia baileyana*, 1.xi.2006; Eynsford, on *Citrus*, 3.xi.2003; London, 22.iv.2005, 23.vi.2009, on *Pittosporum*, 1.viii.2008, on *Acacia dealbata*, 24.xi.2003; Rochester, on *Acacia*, 27.viii.2009. **Collection data.** VC 15: Hawkhurst, nursery, on *Acacia longifolia* from Italy, 23.xi.2006 (PHSI). VC 16: Sevenoaks, wholesale, on *Citrus limon* from Italy, 19.ii.2008 (PHSI).

PSEUDOCOCCIDAE – mealybugs

***Atrococcus cracens* (Williams)** – slender mealybug

European; polyphagous on herbaceous plants; rarely recorded in Britain (Williams, 1962).

Published record. VC 15: Bearsted, on *Chrysanthemum leucanthemum*, 16.ix.1932 (E. E. Green) (Williams, 1962).

***Balanococcus diminutus* (Leonardi)** – phormium or New Zealand flax mealybug

Occurs widely in temperate regions; host specific to *Phormium tenax*; widely naturalised in England and Wales and occasionally a serious pest (Malumphy, 2009b).

Collection data. VC 15. Grove Green, Weaving (TQ7856), 22.iv.2011 (C. Malumphy); Ramsgate (TR3966), 23.iv.2011 (C. Malumphy).

***Balanococcus kwoni* (Pellizzari & Danzig)** (Plate 2, Fig. 3)

Native to South Korea; introduced to Italy and Britain; oligophagous on bamboo. Between December 1998 and June 2011 it was found in the English counties of Derbyshire, Hampshire, Kent, Lancashire, South Yorkshire, Surrey and West Yorkshire at commercial nurseries and botanical gardens, on *Bambusa vivax*, *Bambusa*, *Pharus*, *Phyllostachys bambusoides*, *Phyllostachys nigra*, *Phyllostachys*, *Pleioblastus linearis*, *Pleioblastus variegatus*, *Pleioblastus*, *Sinarundinaria nitida*, *Thamnocalamus crassinodus* and unspecified bamboos. The mealybug has only been found at a commercial nursery in Kent, statutory action was not taken and infested plants may have been sold and planted in private gardens. The mealybug was originally identified as *Trionymus* sp. until it was described as a new species in 2007 from specimens collected in Italy and South Korea (Pellizzari & Danzig, 2007). This species is recorded from the UK for the first time here. It produces conspicuous waxy deposits and has the potential to be a damaging pest.

Collection data. VC 16. Tonbridge, nursery, on *Pleioblastus*, various dates between i.–iv.1999 (PHSI).

***Brevennia pulveraria* (Newstead)** – bluegrass mealybug

European; oligophagous on Poaceae; rarely recorded in Britain (Williams, 1962).

Published record. VC 16: Chislehurst, on *Agrostis vulgaris* and other Poaceae (Newstead, 1903).

***Dysmicoccus walkeri* (Newstead)** – Walker's mealybug

European; polyphagous on Poaceae and occasionally other herbaceous plants; widespread but rarely recorded in Britain (Williams, 1962).

Published records. VC 15: Bearsted, on grasses, 14.ix.1926 (Green, 1928; Williams, 1962). **Collection data.** VC 16: Polhill, 27.vii.1976 (*W. Dolling* det. *L. Huddleston*).

***Fonscolombia europaea* (Newstead)** – grass mealybug

European; polyphagous on Poaceae; rarely recorded in Britain (Williams, 1962).

Published record. VC 15: Dover, in a nest of *Lasius niger* (L.) (Hymenoptera: Formicidae), 6.ix.1924 (*H. Donisthorpe*) (Williams, 1962).

***Mirococcopsis subterranea* (Newstead)** – Russian root mealybug

European; polyphagous on the roots of Poaceae; found in ants' nests, rarely recorded in Britain (Williams, 1962).

Published record. VC 15: Charing, in a nest of *Lasius niger* (Williams, 1962).

***Phenacoccus aceris* (Signoret)** – polyphagous tree mealybug (Plate 2, Fig. 4)

Holarctic; polyphagous on trees and shrubs, especially Rosaceae; locally common throughout Britain (Williams, 1962) and an occasional pest of apple, currants and ornamentals.

Published records. VC 15: Bearsted, on *Ulex europaeus*, 1.iv.1896 (Williams, 1962); Bilting, on *Malus domestica*, 1911 (Theobald, 1912); Wye (Theobald, 1912). VC 16: Blackheath, on *U. europaeus* (Douglas, 1888b; Newstead, 1903; Theobald, 1912); Brockley, on *Ulmus campestris*, v.1886 (Douglas, 1888c); Chislehurst and surrounding district (Theobald, 1912); Lewisham (Williams, 1962); Royal Tunbridge Wells, on *U. europaeus* (Theobald, 1912). **Collection data.** VC 15: Kent International Airport Manston (TR3366), on *Acer pseudoplatanus*, 23.iv.2011 (*C. Malumphy*); Olantigh (TR0648), on *Quercus robur*, 24.iv.2011 (*C. Malumphy*); Ramsgate (TR3865), on *Fagus sylvatica*, 24.iv.2011 (*C. Malumphy*). VC 16: Four Elms (TQ4648), on *Crataegus monogyna*, 19.vi.2011 (*C. Malumphy*).

***Trionymus perrisii* (Signoret)** – Perris' grass mealybug

European; broadly polyphagous on Poaceae and occasionally other herbaceous plants; rarely recorded in Britain (Williams, 1962).

Published record. VC 15: Deal, ix.1899 (*B. Tomlin*) (Newstead, 1903, misidentified as *Brevennia pulveraria* (Newstead); Williams, 1962).

***Trionymus radicum* (Newstead)** – thrift root mealybug

European species; oligophagous on Poaceae; rarely recorded in Britain (Williams, 1962).

Published record. VC 15: Charing, in a nest of *Ponera coarctata* (Latreille) (Hymenoptera: Formicidae) (*H. Donisthorpe*) (Williams, 1962).

***Trionymus thulensis* (Green)** – northern mealybug

Palaeartic; polyphagous on Poaceae; rarely recorded in Britain (Williams, 1962).

Published record. VC 15: Thurnham, on *Trisetum flavescens*, 13.vii.1921 (*E. E. Green*) (Williams, 1962).

COCCIDAE – soft scales

***Coccus hesperidum* L.** – brown soft scale

Cosmopolitan; broadly polyphagous; ubiquitous on indoor plantings and also very common outdoors in urban areas in Britain. A major pest of ornamental plants grown indoors.

Published records. VC 15: Sittingbourne, on *Pachypodium* from the Netherlands, xi.1979 (Seymour & Kilby, 1979). VC 16: Lewisham, on *Laurus nobilis* (outdoors), 9.iv.1888, x.1890 (Douglas, 1888a, 1891c); Sevenoaks, on *Camellia* from the Netherlands, x.1982 (Seymour, Davis & Roberts, 1986a); Sidcup, on *Ficus benjamina* from Belgium, ii.1977 (Seymour, 1978). **RHS records.** The large number of records have been summarised here. VC 15: Ashford; Birchington-on-sea; Broadstone; Broadstairs; Canterbury; Chartham; Chatham; Cranbrook; Dover; Hawkhurst; Kingsdown; Maidstone; Ramsgate; Sheldwich; Tenterden; Westwell; Whitstable. VC 16: Beckenham; Bexley; Bexleyheath; Biggin Hill; Blackheath; Bromley; Crayford; Dulwich; Farnborough; Forest Hill; Hartley; Keston; Leigh; London; Longfield; Plumstead; Orpington; Royal Tunbridge Wells; Sevenoaks; Southborough; Sydenham; Tonbridge, on *Antirrhinum*, *Callistemon*, *Camellia*, *Ceratonia siliqua*, *Choisya ternata*, *Choisya*, *Citrus limon*, *Citrus sinensis*, *Citrus*, *Clematis*, *Euonymus japonicus*, *Euonymus*, *Ficus benjamina*, *Gardenia*, *Hedera canariensis*, *Hedera helix*, *Hedera*, *L. nobilis*, *Olea europaea*, *Nerium oleander*, *Persea americana*, *Prunus armeniaca*, *Schefflera*, *Vitis* and unspecified plants, from 1943 onwards. **Collection data.** VC 15: Canterbury, nursery, on *Citrus*, 16.iv.2004, 7.vi.2005, on *Citrus aurantifolia*, 27.iv.2006 (PHSI); Broadstairs (TR3967), on *Buxus sempervirens*, *Elaeagnus x ebbingei* and *L. nobilis* (all outdoors), 25.iv.2011 (C. Malumphy); Dumpton (TR3966), on *L. nobilis* (outdoors), 25.iv.2011 (C. Malumphy); Grove Green, Maidstone (TQ7856), on *Hedera helix* (outdoors), 22.iv.2011 (C. Malumphy); Ramsgate (TR3865, TR3866), on *L. nobilis* (outdoors), 22–24.iv.2011 (C. Malumphy); Selling (TR0456), 10.ix.1984, indoor plants, 2009, on *L. nobilis* (outdoors), 10.vi.2011 (J. Badmin); Wye (TR0546) 32.iv.1990 (J. Badmin). VC 16: Tunbridge Wells (TQ5839) 24.ii.1990 (J. Badmin).

Eriopeltis sp.

Early records of *Eriopeltis festucae* (Fonscolombe) may refer to any of three native species of *Eriopeltis* now known to occur in Britain (Manawadu, 1986). The identity of the *Eriopeltis* sp. recorded in Kent requires confirmation.

Published record. VC 15: Folkestone Warren (C. O. Waterhouse) (Douglas, 1887c; Newstead, 1903, recorded as *E. festucae*).

Eulecanium ciliatum (Douglas) – ciliate oak scale

European; feeds on *Quercus*; widespread but rarely recorded in Britain.

Published records. Kent (Green, 1916). VC 16: ?1890s, Chislehurst, on *Quercus* (Newstead, 1903). NHM. VC 15: Bearsted, v.1916 (E. E. Green).

Eulecanium excrescens (Ferris) – wisteria scale

Asian, introduced to North America and South-East England; polyphagous; occasionally a serious pest of *Wisteria* in London (Malumphy, 2005; Salisbury, Malumphy & Halstead, 2010).

Published record. VC 16: Bromley, on *Wisteria*, 7.xi.2006 (Salisbury, Malumphy & Halstead, 2010).

Eulecanium tiliae (L.) – nut scale

European, introduced to the Middle East, North Africa, North America and Tasmania; broadly polyphagous on woody plants, especially Rosaceae; common throughout Britain, an occasional pest of woody ornamentals and fruit trees.

Published records. VC 16: Catford, on *Alnus glutinosa*, 9.vi.1886 (Douglas, 1886b); Lewisham, on *A. glutinosa*, 24.xii.1885 (Douglas, 1886b), on *Rubus*, 10.vi.1891 (Douglas, 1892a), on *Salix alba*, vi.1885 (Douglas, 1892b). **RHS records.** VC 15: Gillingham, on *Corylus avellana*, 3.vi.2004. **NHM.** VC 15: Biddenden, on *Carpinus*

betulus, 26.vi.1973 (*D. Dielier*). VC 16: East Malling, on *C. avellana*, 5.iv.1972 (*G. H. L. Dicker*). **Collection data.** VC 15: Blean Wood (TR0861), *Malus*, 25.iv.2011 (*C. Malumphy*); Kent International Airport Manston (TR3366), *Sorbus aria*, 23.iv.2011 (*C. Malumphy*); Olantigh (TR0648), *Quercus robur*, 24.iv.2011 (*C. Malumphy*); Pegwell (TR3564), *C. monogyna*, 23.iv.2011 (*C. Malumphy*); Ramsgate (TR3865, TR3866, TR3965), on *C. monogyna* and *Leycesteria formosa*, 22-24.iv.2011 (*C. Malumphy*). VC 16: Tonbridge, Golden Stable Wood Reserve (TQ6050), on *A. glutinosa*, *Betula pendula*, *Crataegus monogyna* and *Tilia europaea*, 18.v.1989 (*C. Malumphy*).

***Lichtensia viburni* (Signoret) – viburnum cushion scale**

European; polyphagous, most frequently on *Hedera* and *Viburnum*; occurs widely in England and Wales, locally common and an occasional pest.

RHS records. VC 15: Kingsdown, on *H. helix*, 9.vi.1986. VC 16: Sevenoaks, on *H. helix*, 9.vi.2003. **Collection data.** VC 15: Bearsted (TQ7955, TQ8055), on *H. helix* and *V. tinus*, 22.iv.2011 (*C. Malumphy*); Faversham (TR0161), on *Viburnum*, 11.ix.2011 (*J. Badmin*); Ramsgate (TR3864, TR3865, TR3866, TR3965), on *H. helix*, *V. tinus* and *Viburnum*, 22-24.iv.2011 (*C. Malumphy*); Selling (TR0456), on *Viburnum*, 1.ix.2011 (*J. Badmin*). VC 16: Borough Green (TQ6057) on *H. helix*, 22.iv.2011 (*C. Malumphy*); Four Elms (TQ4648), on *H. helix*, 19.vi.2011 (*C. Malumphy*).

***Luzulaspis frontalis* (Green) – long-headed soft scale**

European; oligophagous, most frequently found on *Carex* and *Luzula*; rarely recorded in Britain. Originally described by Green (1928) from specimens collected from Bearsted on *Carex remota*.

Published record. VC 15: Bearsted, on *C. remota*, ix.1927 (Green, 1928).

***Luzulaspis luzulae* (Dufour) – woodrush soft scale (Plate 2, Fig. 6)**

European; polyphagous, most frequently on Juncaceae; widespread but rarely recorded in Britain.

Published record. VC 15: Bearsted, on *Luzula*, ix.1927 (Green, 1928).

***Palaeolecanium bituberculatum* (Signoret) – bituberculate scale (Plate 3, Fig. 1)**

Western Palaearctic; feeds on Rosaceae; widespread in Britain but rarely recorded.

Published records. VC 15: Orpington, on *Crataegus* (Newstead, 1903). VC 16: Lee, on *Crataegus*, 4.iv.1888 (Douglas, 1888a).

***Parthenolecanium corni* (Bouché) – European fruit lecanium or brown scale**

Occurs widely in temperate regions; broadly polyphagous on woody plants; widespread and locally common throughout Britain, a pest of many ornamentals and fruit crops. Green (1930) noted that all earlier publications of *P. persicae* in Britain were referable to *P. corni*.

Published records. VC 15: Bearsted (*E. E. Green*) (Newstead, 1903); Canterbury, on *Ribes uva-crispa*, 1905 (*Hammond*) (Theobald 1906), on *Rosa* (*G. S. Saunders*) (Douglas, 1892b); near Canterbury, on *Ribes*, 1906 (Theobald, 1907); Dover (*Tomlin*) (Newstead, 1903); East Malling, on *Ribes*, 1912 (*Roberts*) (Theobald, 1913); Linton, on *R. uva-crispa* and *Ribes*, 1911 (*Clive Murdock*) (Theobald, 1912); Lyminge, on *R. uva-crispa*, 1907 (Theobald 1908); Mereworth, on *Ribes*, 1906 (Theobald, 1907); Rainham, on *R. uva-crispa* (*Wakely*) (Theobald, 1910); Southfleet, on *Ribes* (*W. Chambers*) (Theobald, 1913); Teynham, on *Ribes rubrum*, *R. uva-crispa* and *Ribes*, 1911 (*Colonel Honeyball*) (Theobald, 1912); Wye, on *Ribes*, 1906 (Theobald, 1907). VC 16: Borough Green, on *Ribes* (*King Smith*) (Theobald, 1912). **RHS records.** The large number of records have been summarised here. VC 15: Birchington-on-Sea; Broadstairs; Canterbury; Chatham; Dover; Hythe; Maidstone;

Sittingbourne; Yalding. VC 16: Bromley; Orpington; Farningham; Keston; London; Rochester; Royal Tunbridge Wells; Sevenoaks; West Dulwich, on *Berberis verruculosa*, *Berberis*, *Carpenteria californica*, *Ceanothus*, *Clematis*, *Corylus*, *Prunus persica*, *Pyracantha*, *Rhododendron*, *Ribes sanguineum*, *R. uva-crispa*, *Ribes*, *Rosa*, *Rubus loganobaccus*, *Viburnum x bodnantense*, *Vitis* and *Wisteria*, from 1944 onwards. **Collection data.** VC 15: Bearsted (TQ8055), on *Fraxinus excelsior*, 22.iv.2011 (C. Malumphy); Broadstairs (TR3967), on *R. sanguineum*, 25.iv.2011 (C. Malumphy); Dumpton (TR3966), on *R. sanguineum*, 25.iv.2011 (C. Malumphy); Ramsgate (TR3864, TR3865, TR3866, TR3965), on *Pyracantha coccinea*, *Ribes sanguineum*, *Rosa canina*, *R. spinosissima*, *Wisteria sinensis* and unidentified shrubs, 23–24.iv.2011 (C. Malumphy). VC 16: Dunton Green (TQ5158) 11.viii.197 (W. Dolling); Four Elms (TQ4648), on *Viburnum* and *Ulmus*, 19.vi.2011 (C. Malumphy).

***Parthenolecanium persicae* (Fabricius) – European peach scale**

Virtually worldwide; broadly polyphagous; widespread in Britain, often found on *Vitis* and ornamentals grown indoors, or on plants grown in warm sunny situations.

NHM. Kent, on *Forsythia*. VC 15: Canterbury, on *Vitis vinifera*, 23.iv.1957 (J. MacFarland). VC 16: Bromley, on *V. vinifera*, 1976 (F. C. Fraser).

***Parthenolecanium pomericum* (Kawecki) – yew scale**

European; feeds on *Taxus*; introduced to Britain in the 1920s and has become widely naturalised. It is an occasional pest (Malumphy, Halstead & Salisbury, 2011).

All records are on *Taxus baccata* unless otherwise specified. **Published record.** VC 15: Selling, Perry Wood, vii.2007 (Malumphy & Badmin, 2007). **RHS records.** VC 15: Canterbury, viii.1948; Cranbrook, x.1944, viii.1946, 15.v.1950, 29.v.1952; Langley, xi.1948; Sissinghurst Castle, viii.1948; Sutton Valence, 10.vii.2006; Yalding, xi.1944, x.1946. VC 16: Edenbridge, 14.x.1941, vi.1948; Horsmonden, 20.ix.1963; Lamberhurst, ix.1943; Penshurst, vi.1947; Royal Tunbridge Wells, 7.xii.1938; Tonbridge, i.1950, 31.v.1960; Westerham, vi.1946. **NHM.** VC 15: Wye, 5.vii.1972 (D. J. Williams). VC 16: Sevenoaks, 14.ii.1982 (W. Dolling). **Collection data.** VC 15: Bearsted (TQ8055), 22.iv.2011 (C. Malumphy); Dargate (TR0861), 25.iv.2011 (C. Malumphy); Selling (TR0456), 25.viii.2011 (J. Badmin).

***Parthenolecanium rufulum* (Cockerell) – oak soft scale (Plate 3, Fig. 2)**

European; feeds on *Quercus*, and occasionally other woody plants; widespread, locally common in southern England but rarely recorded.

Collection data. All records are on *Q. robur*. VC 15: Olantigh (TR0648), 24.iv.2011 (C. Malumphy). VC 16: Ide Hill (TQ4851), 19.vi.2011 (C. Malumphy); Tonbridge, Golden Stable Wood Reserve (TQ6050), 18.v.1989 (C. Malumphy).

***Physokermes hemicryphus* (Dalman) – small spruce-bud scale**

European, introduced to North America; feeds on *Picea*, and rarely *Abies*; widespread in Britain but rarely recorded. Malumphy (2009a) showed that early records of *P. piceae* in Britain were referable to *P. hemicryphus*.

Published record. VC 15: Wye, on *Picea abies* (J. V. Theobald) (Malumphy, 2009a).

***Pulvinaria floccifera* (Westwood) – cottony camellia scale**

Cosmopolitan; broadly polyphagous; naturalized throughout Britain. It has increased its host plant range and abundance in England and Scotland during recent decades (Malumphy & Badmin, 2007), and is a serious pest of *Camellia*, *Ilex* and *Rhododendron* (Malumphy, 2009b).

Published record. VC 15: Selling, near Perry Wood, on *Taxus baccata*, July 2007 (Malumphy & Badmin, 2007). **RHS records.** The large number of records have been summarised here. VC 15: Birchington-on-Sea; Canterbury; Folkestone; Gillingham; Hempstead; Hythe; Maidstone; Saltwood; Tenterden; Warehorne; Wouldham; Yalding. VC 16: Beckenham; Bexley; Bexleyheath; Bickley; Chislehurst; Gravesend; Kennington; London; Orpington; Royal Tunbridge Wells; Sevenoaks; Tonbridge; West Wickham; Westerham, on *Camellia*, *Choisya*, *Euonymus*, *Ilex*, *Pittosporum*, *Rhododendron*, *Taxus* and *Trachelospermum jasminoides*, from 1981 onwards. **Collection data.** VC 15: Ashford, nursery, on *Choisya ternata*, 5.vi.2007 (PHSI); Saltwood, nursery, on *Rhododendron*, 12.vi.2007 (PHSI); Bearsted (TQ7955, TQ8055), on *Euonymus japonicus* 'albomarginatus' and *Ilex aquifolium*, 22.iv.2011 (C. Malumphy); Bilting (TR0549), on *I. aquifolium*, 24.iv.2011 (C. Malumphy); Dargate (TR0861), on *I. aquifolium* and *T. baccata*, 25.iv.2011 (C. Malumphy); Perry Wood (TR0455), on *Ilex*, 5.vii.2010, 25.viii.2011, (J. Badmin); Ramsgate (TR3864, TR3865, TR3866, TR3965, TR3966), on *Camellia sinensis*, *I. aquifolium*, *I. aquifolium* 'argentea marginata' and *T. baccata*, 22-24.iv.2011 (C. Malumphy); Selling (TR0456), on *Camellia*, *E. japonicus* and *Rhododendron ponticum* variegated, 5.vii.2010, 25.viii.2011 (J. Badmin). VC 16: Goudhurst, nursery, on *Juniperus chinensis* from China, 6.iii and 20.iii.2009 (PHSI); Borough Green (TQ6057), on *E. japonicus* 'albomarginatus', *I. aquifolium* and *Skimmia japonica*, 22.iv.2011 (C. Malumphy); Ide Hill (TQ4851), on *I. aquifolium*, *Rhododendron* (several species including azaleas) and *T. baccata*, 19.vi.2011 (C. Malumphy); Four Elms (TQ4648), on *I. aquifolium*, 19.vi.2011 (C. Malumphy); Toys Hill (TQ4651), on *I. aquifolium*, 19.vi.2011 (C. Malumphy).

***Pulvinaria hydrangeae* (Steinweden) – hydrangea scale (Plate 3, Fig. 3)**

Widespread in Europe, North America, Australia and New Zealand; polyphagous; found throughout England. A serious pest of *Hydrangea*, *Viburnum* and other ornamental plants.

RHS records. All records are on *Hydrangea*, unless stated otherwise. VC 15: Ashford, on *Prunus*, 25.vi.2007; Bilting, 22.vi.2007; Maidstone, 7.ix.2007; Maidstone, 6.xi.2007; Old Wives Lees, 24.ix.1996; Sittingbourne, 16.vii.2007, 12.iii.2008. VC 16: Beckenham, 16.vi.1993, 20.vii.1998, on *Rheum*, 30.vi.2003; Bexley, 4.vi.2007; Bromley, 21.vi.1999; Charlton, on *Lavatera*, 29.vi.1990; Dartford, 11.vi.2003; East Dulwich, 24.v.2007; Eltham, 18.viii.1997; London, 15.vii.2008, 28.ii.1991, 23.vi.2005, 11.iii.1992, 17.vi.2009, 26.vi.2009, 11.ii.1999, on *Prunus*, 28.vii.2005; Orpington, 24.viii.2004; Rochester, 13.vi.2008, on *Acer*, 17.viii.2007 and 9.x.2007; Sydenham, 11.vii.1994; Tonbridge, 17.vi.2010; Welling, 24.vi.2003, 29.vii.1997; West Malling, 25.vi.1998; West Norwood, 17.vii.1995. **Collection data.** VC 15. Bilting (TR055491), on *Viburnum*, 24.iv.2011 (C. Malumphy); Faversham (TR0160), on *Acer* (J. Badmin & W. Denne); Ramsgate (TR3865), on *Viburnum*, 24.iv.2011 (C. Malumphy).

***Pulvinaria regalis* (Canard) – horse chestnut scale (Plate 3, Fig. 4)**

Occurs widely in Europe; polyphagous on woody plants; present throughout Britain except for the north of Scotland, and frequently found at very high densities. It is the most abundant coccid in urban areas throughout Britain (see Fig. 1).

Published records. All Badmin (1990, 1992). VC 15: Boughton Street, on *Aesculus hippocastanum*, 9.vi.1990; Canterbury, on *A. hippocastanum* and *Tilia*, 16.vi.1990, and *Acer negundo*, 25.vii.1990; Chatham, Natural Resources Institute, on *Tilia*, 12.vi.1990; Faversham, on *Laurus nobilis*, 16.xii.1989, and *Tilia*, 2.vi.1990; Maidstone, Springfield, on *A. hippocastanum*, 8.vi.1990; Selling, on *Acer pseudoplatanus*, 2.vi.1990; Sittingbourne, on *Tilia*, 20.vi.1990; Tonbridge, Golden Stable Wood Reserve

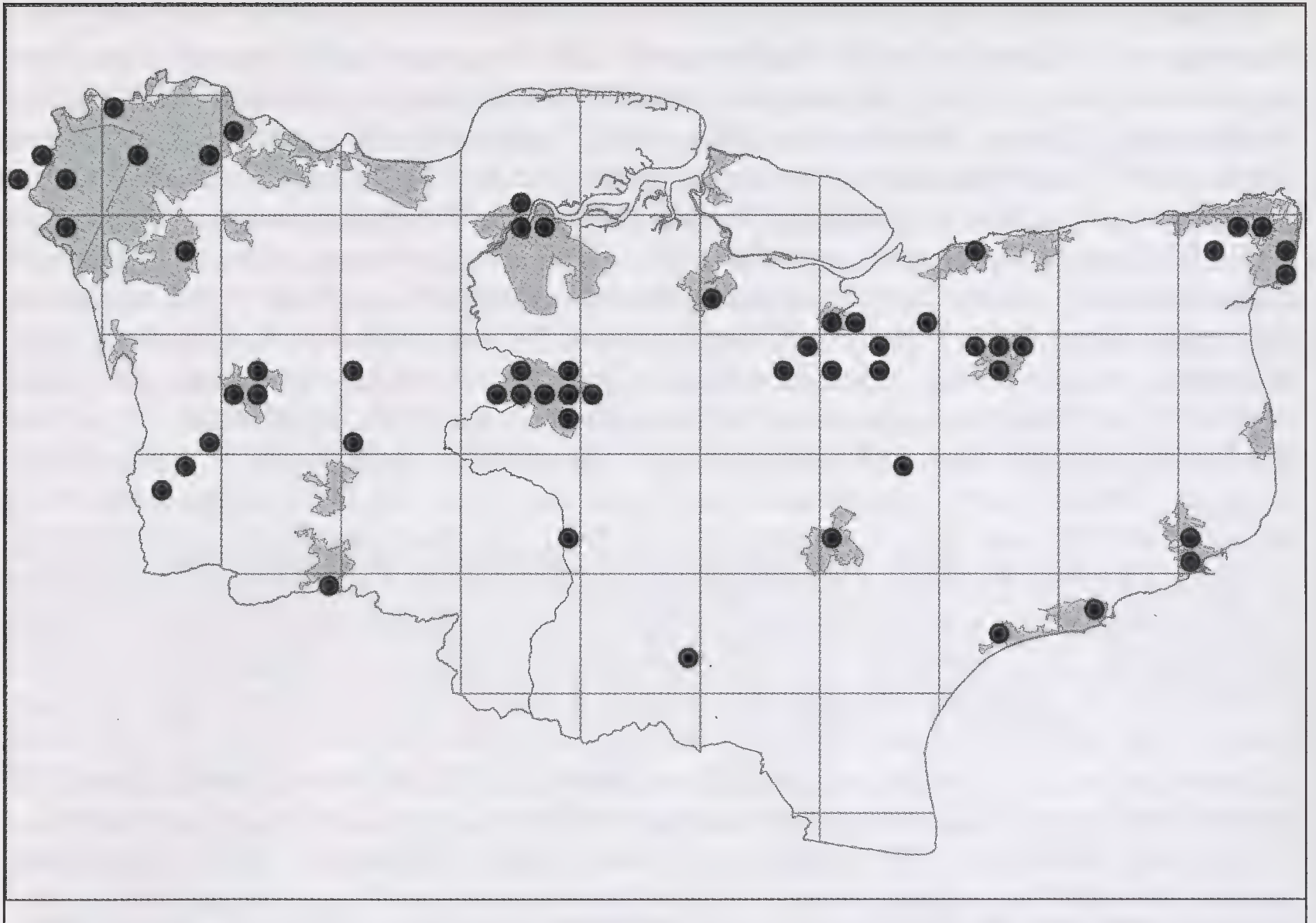


Figure 1. Distribution of horse chestnut scale *Pulvinaria regalis* in relation to the main urban areas of Kent. Map produced by A.Witts, Kent & Medway Biological Records Centre.

(TQ6050), 18.v.1989 (C. Malumphy). VC 16: Frindsbury and Upnor, on *A. pseudoplatanus*, 10.vi.1990. **RHS records.** VC 15: Eastling, on *Cornus controversa*, 29.v.1998; Folkestone, on *Acer*, 27.v.1993; Maidstone, on *Aesculus*, 8.vi.2007. VC 16: Beckenham, on *Acer*, 14.v.2007; Bexleyheath, on *A. negundo*, 12.v.1998; Catford, on *Cornus alba*, 22.ii.1996; Charlton, on *Acer platanoides* 'Drummondii' and *Magnolia*, 4.viii.1995; Dulwich, on *Aesculus* and *Tilia*, 18.vii.1972; Eltham, on *Aesculus*, 28.ix.1993; London, on *Aesculus*, 13.vii.1970, *Acer* and *Magnolia*, 3.viii.2010; Nunhead, on *Cornus*, 28.vi.1995; Orpington, on *L. nobilis*, 5.ii.1996; Rochester, 25.v.2000, on *Tilia*, 21.v.2008; Royal Tunbridge Wells, on *L. nobilis*, 6.viii.1987; Sevenoaks, on *Skimmia* and *Hedera*, 9.vi.2003, *Skimmia*, 4.viii.1989, and *L. nobilis*, 7.vii.2010. **Collection data.** All samples were collected by C. Malumphy, unless stated otherwise. VC 15: Bearsted (TQ7955, TQ8055), on *Acer campestre*, *A. pseudoplatanus* and *Viburnum*, 22.iv.2011; Broadstairs (TR3967), on *A. pseudoplatanus*, 25.iv.2011; Canterbury (TR1557, TR1358, TR1457, TR1659), on *Acer*, various dates vi.2011 and 4.ix.2011 (J. Badmin); Chestfield (TR1366), on *Acer*, 16.viii.2011 (J. Badmin); Dargate (TR0861), on *A. pseudoplatanus*, 25.iv.2011; Dumpton (TR3966), on *A. campestre*, *A. platanoides*, *A. platanoides* 'Crimson King', *A. pseudoplatanus* and *Tilia* × *europaea*, 25.iv.2011; Dumpton Gap (TR3966), on *A. campestre*, *A. pseudoplatanus*, *A. pseudoplatanus* 'atropurpurea' and *Ulmus procera*, 25.iv.2011; East Barming, Maidstone (TQ7355), on *Acer*, 10.vii.2011 (J. Badmin); Faversham (TR0161, TR0261), on *Acer*, 4.vii.2010, 28.viii.2011 (J. Badmin); Grove Green, Maidstone (TQ7856), on *A. hippocastanum*, 22.iv.2011; Kent International Airport Manston (TR3366), on *A. pseudoplatanus* and *T. × europaea*, 23.iv.2011; Maidstone (TQ7555, TQ7853), on *Acer*, 2.vii.2010, 10.vii.2011 (J. Badmin); Margate

(TR3669, TR3569), on *Acer*, 2010 (*J. Badmin*); Olantigh (TR0648), on *A. pseudo-platanus*, 24.iv.2011; Painter's Forstal (TQ9958), on *Acer*, 10.vii.2011, (TQ9959) heavy infestation on *A. pseudoplatanus*, 10.vi.1992 (*J. Badmin*); Ramsgate (TR3864, TR3865, TR3866, TR3965, TR3966), on *A. platanoides*, *A. pseudoplatanus*, *A. pseudoplatanus* 'atropurpurea', *Aesculus hippocastanum*, *Euonymus*, *T. × europaea*, *Tilia*, *Ulmus glabra*, *U. procera* and unidentified shrubs and trees, 22–25.iv.2011; Selling (TR0456), on *Acer*, 5.vii.2010 (*J. Badmin*); Sheldwich (TR0156), on *Acer*, 6.vii.2010 (*J. Badmin*); Staplehurst (TQ7842), on *Acer*, 11.vii.1998 (*J. Badmin*); Tenterden (TQ8833), on *Acer*, 20.vii.2011 (*J. Badmin*). VC 16: Barnehurst, on *L. nobilis*, vi.1988 (*J. H. Martin*); Bessells Green, Sevenoaks (TQ5055), on *Acer*, 3.vii.2011 (*J. Badmin*); Borough Green (TQ6057), on *A. pseudoplatanus* 'atropurpurea' and *T. × europaea*, 22.iv.2011; Edenbridge (TQ4446), on *A. campestre*, *A. pseudoplatanus*, *Aesculus hippocastanum* and *Tilia*, 19.vi.2011; Four Elms (TQ4648), on *A. campestre*, 19.vi.2011; Ide Hill (TQ4851), on *A. campestre*, *A. palmatum*, *A. palmatum* 'dissectum', *A. pseudoplatanus*, *Aesculus hippocastanum*, ?*Magnolia*, *T. cordata*, *T. × europaea* and *U. glabra*, 19.vi.2011; Riverhead, Sevenoaks (TQ5256), on *Acer*, 3.vii.2011 (*J. Badmin*); Royal Tunbridge Wells (TQ5839, TQ5939), on *Acer*, 10.ix.2011 (*J. Badmin*); Saint Johns, Sevenoaks (TQ5356), on *Acer*, 3.vii.2011 (*J. Badmin*).

***Pulvinaria vitis* (L.)** – woolly vine scale

Palearctic and Nearctic; polyphagous; widespread and locally common throughout Britain. It is an occasional pest of grapevine, peach and currants. Badmin (1990) reported a *Pulvinaria* sp. from Woodstock, on *Cotoneaster horizontalis*, 1988, which is suspected to be *P. vitis*, as it is the only *Pulvinaria* species known on *Cotoneaster* in Britain. Two dead immature coccids suspected to be *P. vitis* were collected from Bilting (VC 15), on *Viscum album*, 24.iv.2011 (*C. Malumphy*). This is not a confirmed host plant and the scales may have simply wandered off the *Malus domestica* (a known host for *P. vitis*) on which the *V. album* was growing.

Published records. VC 15: Barming, on *Ribes uva-crispa*, v.1909 (*Selby Smith*) (Theobald 1910); near Maidstone (*A. O. Walker*) (Newstead, 1903; Theobald, 1908); Sittingbourne, Borden Hall, on *R. uva-crispa* and *Ribes nigrum*, 13.vi.1911 (*L. Levy*) (Theobald, 1912 – 'severe infestation practically killing plants'). VC 16: Lewisham, on *Alnus glutinosa*, 23.xii.1885 (Douglas, 1891a; Newstead, 1903), and *Crataegus*, v.1884 (Douglas, 1891d); Lee, on *Crataegus*, 5.vi.1891 (Douglas, 1891d). **RHS records.** VC 15: Broomfield, on *Ribes*, 17.viii.1993; Faversham, on *Pyracantha*, 27.xi.1990; Gillingham, on *Betula*, 9.vi.2004; Wye, on *Pyracantha*, 19.v.1944. VC 16: London, 28.vi.2001, and *Ribes*, 7.vii.1995; Orpington, on *R. nigrum*, 4.vi.2007; Sidcup, on *Rubus*, 15.i.2002, *Ribes rubrum*, 10.vii.1979, and *Vitis*, 29.vi.1994; Tonbridge, on *Pyracantha*, vi.46. **NHM.** Kent, on *Ribes*, 21.v.1949 (*Fitchew*). VC 16: East Malling, on *Populus*, vi.1929 (*A. M. Masee*); Lewisham, on *Crataegus*, vi.1891 (*R. Newstead*). **Collection data.** VC 15: Dumpton (TR3966), on *Alnus glutinosa*, 25.iv.2011 (*C. Malumphy*); Ramsgate (TR3866, TR3965) on *Crataegus monogyna*, 23-24.iv.2011 (*C. Malumphy*). VC 16: Lewisham, on *C. monogyna*, 21.v.1989 (*C. Malumphy*); Tonbridge, Golden Stable Wood Reserve (TQ6050), on *A. glutinosa*, 18.v.1989 (*C. Malumphy*).

KERMESIDAE – gall scales

***Kermes roboris* (Fourcroy)** – English oak kermes

Trans-Palearctic; feeds on *Quercus*; rarely recorded in Britain.

Published record. VC 15: Blean Wood, Herne, on *Q. robur*, ix.1897 (*C. O. Waterhouse*) (Newstead, 1903).

ERIOCOCCIDAE – felt scales

Cryptococcus fagisuga (Lindinger) – beech bark scale (Plate 3, Fig. 5)

European, introduced to North America; feeds on *Fagus*; common and widespread throughout Britain, frequently at very high densities (Williams, 1985). It is associated with the transmission of a fungal beech bark disease caused by *Nectria coccinea* var. *faginata* and *Neonectria galligena* (Ascomycota: Hypocreales: Nectriaceae) (Kosztarab & Kozár, 1988). Theobald (1905) described beech bark scale ‘as the most destructive forest pest in Britain’.

All the records were on *F. sylvatica*. **Published records.** Kent (Theobald, 1904). VC 15: Bearsted (*E. E. Green*) (Newstead, 1903), 27.vii.1913 (*E. E. Green*) (Williams, 1985); near Canterbury, 19.v.1973 (*L. M. Hanford*) (Williams, 1985); Faversham, ix.1911 (*H. Horden*) (Theobald, 1912); Leeds, 1905 (Theobald, 1906); near Maidstone, 1910 (Theobald, 1911). VC 16: Blackheath, v.1886 (Douglas, 1886c); Chislehurst (Newstead, 1903); Combe Bank, Sevenoaks, 1907 (*C. Day*) (Theobald, 1908); East, 1906 (Theobald, 1907); Malling (Newstead, 1903), ix.1895 (*E. E. Green*) (Williams, 1985); Sevenoaks, Chevening House, 1904–5 (Theobald, 1905, 1906). **RHS records.** VC 15: Eastry, 29.iv.1993; Lyminge, 10.ix.1985; Ospringle, 13.ii.1978, 29.ii.1980; Sittingbourne, 27.viii.1959; Woodnesborough, 14.iv.1997. VC 16: Bickley, 7.vi.1993; Bromley, 29.xi.1939; Gravesend, 3.ix.1984. **Collection data.** VC 15: Ramsgate (TR3866), 24.iv.2011 (*C. Malumphy*).

Eriococcus cantium (Williams) – Kentish felt scale

England and Poland; on *Brachypodium sylvaticum*; rarely recorded in Britain. Described by Williams (1985) from specimens collected from Bearsted and named after the Latin word for Kent.

Published record. VC 15: Bearsted, on *B. sylvaticum*, 30.vii.1925 (*E. E. Green*) (Williams, 1985).

Eriococcus greeni (Newstead) – Newstead’s felt scale (Plate 3, Fig. 6)

European, introduced to North America; polyphagous on Poaceae; widespread but rarely recorded in Britain (Williams, 1985).

Published records. VC 15: Bearsted, on grass, ix.1927 (Williams, 1985); Thurnham, on grass, 15.ix.1926 (Green, 1928).

Eriococcus insignis (Newstead) – conspicuous felt scale

European, introduced to North America; polyphagous on Poaceae and herbaceous plants; widespread but rarely recorded in Britain (Williams, 1985).

Published records. VC 15: Bearsted, Chislehurst and Orpington (*E. E. Green*) (Newstead, 1903); Thurnham, on grass, 15.ix.1926 (*E. E. Green*) (Williams, 1985).

Eriococcus placidus (Green) – smooth felt scale

European; oligophagous on Poaceae; rarely recorded in Britain (Williams, 1985).

Published records. VC 15: Bearsted, on *Brachypodium sylvaticum*, 30.vii.1925 (*E. E. Green*) (Williams, 1985); Thurnham, on *Avena flavescens* and *B. sylvaticum*, 13.vii.1921 (*E. E. Green*), on ?*Festuca*, 8.ix.1920 (*E. E. Green*) (Williams, 1985).

Eriococcus pseudinsignis (Green) – boreal felt scale

European; polyphagous on Poaceae and herbaceous plants; widespread but rarely recorded in Britain (Williams, 1985).

Published record. VC 15: Thurnham, on *Festuca*, 9.ix.1920 (*E. E. Green*) (Williams, 1985).

***Pseudochermes fraxini* (Kaltenbach)** – ash bark scale

European; feeds on *Fraxinus* and occasionally *Syringa*; widespread and common throughout Britain (Williams, 1985), frequently at very high densities together with *Chionaspis salicis* (L.).

All records are on *F. excelsior*. **Published record.** VC 15: Bearsted, vii.1913 (*E. E. Green*) (Green, 1915; Williams, 1985). **Collection data.** VC 15: Bearsted (TQ8055), 22.iv.2011 (*C. Malumphy*); Blean Wood (TR0861), 25.iv.2011 (*C. Malumphy*); Dumpton (TR3966), 25.iv.2011 (*C. Malumphy*); Olantigh (TR0648), 24.iv.2011 (*C. Malumphy*); Ramsgate (TR3865, TR3866), 24.iv.2011 (*C. Malumphy*); Selling (TR0456), 10.vi.1985, 25.vii.2011 (*J. Badmin*). VC 16: Whitley Forest (TQ5053) 29.v.1977 (*W. Dolling det. D. Williams*).

ASTEROLECANIIDAE – pit scales***Asterodiaspis quercicola* (Bouché)** – small oak pit scale

Western Palaearctic species, introduced to North America, South Africa, New Zealand and Mauritania; feeds on *Quercus*; widespread and common throughout Britain.

Published records. All records are on *Quercus*. VC 15: Bearsted, vii–viii (Green, 1895). VC 16: Eltham and Lee, xi.1885 (Douglas, 1886a); Royal Tunbridge Wells (*G. S. Saunders*) (Douglas, 1885).

***Asterodiaspis variolosa* (Ratzeburg)** – golden pit scale

Western Palaearctic species that has become almost cosmopolitan; feeds on *Quercus*; widespread and common throughout Britain.

Published records. All records are on *Quercus*. VC 15: Bearsted (*E. E. Green*) (Newstead, 1903); Kent International Airport Manston (TR3366), on *Q. robur*, 23.iv.2011 (*C. Malumphy*). VC 16: Chislehurst, Farnborough and Orpington (Newstead, 1903).

DIASPIDIDAE – armoured scales

In addition to the diaspidids recorded below the RHS have records of *Carulaspis* sp. from Beckenham, on *Chamaecyparis lawsoniana*, 29.x.1941; Bromley, on *Juniperus*, 28.viii.2003; Sevenoaks, Knockholt, on $\times$ *Cupressocyparis leylandii*, 12.x.2005; Royal Tunbridge Wells, on *Juniperus*, 4.x.1972 and $\times$ *C. leylandii*, 12.iii.2008. There are two species of *Carulaspis* recorded on these host plants present in Britain, *C. juniperi* (Bouché) and *C. minima* (Targioni-Tozzetti) (Boratynski, 1957), and voucher specimens were unavailable to confirm the identity of these records.

***Aulacaspis rosae* (Bouché)** – rose scurfy scale

Cosmopolitan; polyphagous, especially Rosaceae; widespread but only occasionally recorded in Britain, a pest of roses.

Published records. VC 15: Bearsted, on *Rosa canina* and *Rosa* ‘Gloire de Dijon’, July–August (Green, 1895); Sellindge, on *Rosa* ‘Maréchal Neil’ grown under glass, ?1893 (Theobald, 1905). **RHS records.** VC 15: Faversham, on *Rosa*, 16.xii.2009; Rainham, on *Rosa*, 26.ix.1994. VC 16: Gravesend, on *Rosa centifolia* and *Rosa* ‘scharlachglut’, 29.i.1976. **Collection data.** VC 15: Broadstairs (TR3967), on *Rosa*, 25.iv.2011 (*C. Malumphy*); Dumpton (TR3966), on *Rosa*, 25.iv.2011 (*C. Malumphy*); Ramsgate (TR3864, TR3865, TR3866), on *Rosa* and *R. spinosissima*, 23–24.iv.2011 (*C. Malumphy*).

***Carulaspis juniperi* (Bouché)** – juniper scale

Mediterranean, introduced to Australia, New Zealand, and North and South America; feeds on Cupressaceae (and occasionally Pinaceae, Taxaceae and

Taxodiaceae); rarely recorded in Britain but recently found to occur widely in southern England by the author.

Collection data. VC 15: Bearsted (TQ8055), on *Cupressus torulosa*, 22.iv.2011 (C. Malumphy); Ramsgate (TR3966), on *Cupressus*, *Juniperus*, *Thuja* and unidentified Cupressaceae, 23.iv.2011 (C. Malumphy); Woodstock (TQ9060) 30.x.1984 (J. Badmin). VC 16: Gouldhurst, nursery, on *Juniperus chinensis* and *J. rigida* from China, 6.iii.2009 (PHSI).

***Carulaspis minima* (Signoret) – minute cypress scale**

Mediterranean, introduced to West Africa, Hawaii, North and South America, and the Caribbean; feeds on Cupressaceae (and occasionally Cephalotaxaceae and Taxodiaceae); rarely recorded in Britain but recently found to occur widely in northern and southern England by the author.

Collection data. VC 15: Ramsgate (TR3864), on *Juniperus scopulorum*, 24.iv.2011 (C. Malumphy). VC 16: nursery, on *J. chinensis* and *J. rigida* from China, 6.iii.2009 (PHSI); Borough Green (TQ6057), on $\times$ *Cupressocyparis leylandii*, 22.iv.2011 (C. Malumphy); Four Elms (TQ4648), on $\times$ *C. leylandii*, 19.vi.2011 (C. Malumphy). Borough Green (TQ6057), on $\times$ *Cupressocyparis leylandii*, 22.iv.2011 (C. Malumphy); Four Elms (TQ4648), on $\times$ *C. leylandii*, 19.vi.2011 (C. Malumphy).

***Chionaspis salicis* (L.) – willow scale (Plate 4, Fig. 1)**

Palearctic, introduced to parts of Asia and North America; broadly polyphagous on woody plants; widespread and very common throughout Britain, an occasional pest of willow and currant.

Published records. Kent, on *Fraxinus excelsior* (Theobald, 1904). VC 15: Bearsted (E. E. Green) and near Orpington on *Ulmus campestris*, *Euonymus europaeus*, *Viburnum lantana* and *Acer campestre* (Newstead, 1901); Wye, on *F. excelsior*, *Ribes rubrum*, *R. sanguineum* and *Ribes*, v.1911 (Theobald, 1912). VC 16: Lee, on *Acer*, *F. excelsior* and *Salix* (Douglas, 1885, 1886a); Lewisham, on *Alnus glutinosa* (Douglas, 1886a). **Collection data.** VC 15: Olantigh (TR0648), on *A. glutinosa* and *Salix alba*, 24.iv.2011 (C. Malumphy); Ramsgate (TR3965), on *F. excelsior*, 23.iv.2011 (C. Malumphy). VC 16: Four Elms (TQ4648), on *A. campestre* and *Quercus robur*, 19.vi.2011 (C. Malumphy).

***Diaspidiotus bavaricus* (Lindinger) – blueberry armoured scale**

European; feeds on Ericaceae; occurs widely in Britain but is rarely recorded.

Published records. VC 15: Bearsted, on *Calluna vulgaris* (E. E. Green) (Newstead, 1901). NHM. VC 15: Hothfield, vi.1913 and Maidstone, iii.1896 on *C. vulgaris* (E. E. Green).

***Diaspidiotus ostreaeformis* (Curtis) – pear oyster-shell scale**

Trans-Palaearctic species, spread to North and South America, Australia and New Zealand; broadly polyphagous, mainly on trees and common on Rosaceae; widespread but rarely recorded in Britain, a pest of deciduous fruit trees (Kozár, 1990).

Published records. VC 15: Maidstone and Sittingbourne on *Malus domestica*, *Prunus armeniaca*, *Prunus domestica*, *Prunus persicae* and *Pyrus communis* (Theobald, 1907). VC 16: Lewisham, on *M. domestica*, *Prunus cerasi*, *P. domestica* and *P. communis* (Douglas, 1887a; Newstead, 1901).

***Diaspidiotus pyri* (Lichtenstein) – pear oyster-shell scale**

European; polyphagous; rarely recorded in Britain, a pest of pear and plum, and occasionally apple and peach. Information on this species is scarce partially due to confusion with *D. ostreaeformis*.

NHM. VC 16: East Malling, on *Malus domestica*, viii.1970 (G. H. L. Dicker), *Pyrus*, 26.ii.1971, 9.x.1970, 13.xii.1970, *Pyrus malus*, 13.i.1971, and *Prunus domestica*, 6.vii.1972 (D. J. Williams).

***Diaspidiotus zonatus* (Frauenfeld)** – zonate armoured scale (Plate 4, Fig. 2)

European; feeds on woody plants, most frequently on *Quercus*; widespread and locally common in Britain but rarely recorded.

All the following records are on *Quercus robur*. **Published records.** VC 15: Bearsted, August-September (Green, 1895); Bearsted (E. E. Green), Orpington and district, Chislehurst, Frant Wood (Saunders) (Newstead, 1901). VC 16: Lewisham, 27.ix.1886 (Douglas, 1886c; Newstead, 1901). **Collection data.** VC 15: Blean Wood (TR0861), 25.iv.2011 (C. Malumphy); Kent International Airport Manston (TR3366), 23.iv.2011 (C. Malumphy). VC 16: Four Elms (TQ4648), 19.vi.2011 (C. Malumphy); Ide Hill (TQ4851), 19.vi.2011 (C. Malumphy).

***Dynaspidiotus britannicus* (Newstead)** – holly scale (Plate 4, Fig. 3)

Present in Europe, North and South America; polyphagous, most commonly found on *Buxus*, *Hedera*, *Ilex* and *Laurus*; rarely recorded in Britain.

RHS records. VC 16: Benenden, on *Buxus*, 7.ii.2006. **Collection data.** VC 15: Ramsgate (TR3965), on *Ruscus aculeatus*, 22.iv.2011 (C. Malumphy).

***Lepidosaphes ulmi* (L.)** – mussel scale

Widespread in temperate regions; broadly polyphagous on woody hosts, especially Rosaceae; common throughout Britain, a pest of apple, pear, cherry, walnut and many others.

Published records. VC 15: on *Fraxinus excelsior* (Theobald, 1908); Borden Hall, Sittingbourne, on *Malus domestica* and *Ribes uva-crispa*, (L. Levy) (Theobald, 1913); Chart Sutton, on *Ribes*, 1913 (Roberts) (Theobald, 1913); Harbledown, on *M. domestica*, ii.1911 (Theobald, 1912); Patricxbourne, 1911 (Theobald, 1912); Sittingbourne (Theobald, 1908); Smarden (Theobald 1911); Woodstock, on *Cotoneaster horizontalis*, i.1990 (Badmin, 1990); Wye, on *M. domestica*, 1906 (Theobald, 1907), and fruit trees, 1911 (Theobald, 1912); Yalding (Theobald, 1911). VC 16: Blackheath, on *Ulex europaeus*, 14.xii.1885 (Douglas, 1886a); Borough Green, on *M. domestica*, 1911 (Theobald, 1912); Mereworth, on *M. domestica*, 1906 (Theobald, 1907). **RHS records.** VC 15: Birchington-on-sea, on *Malus*, 9.i.1986; Chatham, on *Pyrus*, 28.v.1962; Cranbrook, on *Buxus*, 25.viii.1998; Eastling, on *Cornus controversa*, 29.v.1998; Sandwich, on *Buxus*, 6.ii.2007, 10.ix.2007. VC 16: Bromley, on *Buxus*, 12.iii.1997; Catford, on *Cornus alba*, 22.ii.1996; Dartford, on *Buxus*, 23.ix.2010; Forest Hill, on *Malus*, viii.1954; London, on *Malus*, 15.vii.1965; London, on *Malus*, 18.xii.1969, on *Buxus*, 4.v.2005; Longfield, on *Malus*, 26.viii.2008; Orpington, on *Malus*, 7.iii.1968; Sevenoaks, on *Malus*, 15.x.1935; Sevenoaks, on *Sorbus aria*, 1.viii.1966; West Dulwich, on *Cotoneaster*, 25.viii.1993. **Collection data:** All samples were collected by C. Malumphy, unless stated otherwise. VC 15: Bearsted (TQ8055), on *M. domestica*, 22.iv.2011; Bilting (TR0549), on *M. domestica*, 24.iv.2011; Dumpton (TR3966), on *Crataegus monogyna* and *Prunus cerasifera* ‘atropurpurea’, 25.iv.2011; Kent International Airport Manston (TR3366), on *Sorbus aria*, 23.iv.2011; Ramsgate (TR3865, TR3965), on *Crataegus* and *M. domestica*, 23-24.iv.2011; Selling (TR0456), on *Malus*, 17.viii.1985 (J. Badmin); Woodstock (TQ9060) 2.i.1990 (J. Badmin).

***Unaspis euonymi* (Comstock)** – euonymus scale (Plate 4, Fig. 4)

Widespread in warm temperate regions; polyphagous; naturalized throughout England, a major pest of *Euonymus*, in particular *E. japonicus*.

All records are on *Euonymus*. **RHS records.** VC 15: Broadstairs, 8.ix.1989, on *E. japonicus*, 30.v.1997; Canterbury, 13.viii.1993; Faversham, 18.viii.2005; Folkestone, 11.viii.2010; Gillingham, 13.viii.2009; Great Mongeham, on *E. japonicus*, 30.vi.1993; Maidstone, 23.vii.2009, 13.ix.2010; Swale, Newington, 1.vi.2005. VC 16: Beckenham, on *E. japonicus*, 30.viii.1994; Bexley, 22.iv.2009, 20.viii.2009; Bexleyheath, 24.ix.2003; Bromley, 29.viii.1995; Catford, 9.viii.2001; Crayford, on *E. japonicus*, 8.xi.1996; Gravesend, 29.viii.2008; London, 16.xi.2009; Orpington, unidentified, 10.iii.2003; Petts Wood, 22.viii.2000; Royal Tunbridge Wells, 15.viii.2000; Sevenoaks, on *E. fortunei*, 7.iii.2000; Tonbridge, 21.viii.2008. **Collection data.** All samples were collected by C. Malumphy. VC 15: Broadstairs (TR3967), on *E. japonicus*, 25.iv.2011; Dumpton (TR3966), on *E. japonicus*, 25.iv.2011; Dumpton Gap (TR3966), on *E. japonicus*, 25.iv.2011; Ramsgate (TR3865, TR3866, TR3965), on *E. japonicus* and *E. japonicus* 'albomarginatus', 22–24.iv.2011.

INTRODUCED SPECIES ESTABLISHED ON INDOOR PLANTINGS

Scale insects found on indoor plantings often occur as transient populations that exist for as long as suitable host plants are available or until measures are taken to control them. Therefore, not all of the following species will be present continuously in Kent, although they are established elsewhere in the UK. Some of the species may be found outdoors during the summer months.

PSEUDOCOCCIDAE – mealybugs

Theobald (1906, 1913) reported *Pseudococcus longispinus* (Targioni Tozzetti) from Ashford and Blackheath on several host plants, but did not distinguish *P. longispinus* from *P. viburni* (Signoret) and there are no voucher specimens available, so it is not possible to be certain which species was recorded.

***Geococcus coffeae* (Green)** – coffee root mealybug

Pantropical and subtropical; broadly polyphagous, feeds on roots; restricted to a small number of botanical collections and rarely recorded in Britain.

Published record. VC 16: Meopham, on *Dieffenbachia* from India, iv.1976 (Seymour, 1978).

***Nipaecoccus nipae* (Maskell)** – coconut mealybug

Cosmopolitan, restricted to indoor plantings in cooler regions; polyphagous, especially on Arecaceae; restricted to a small number of botanical collections and rarely recorded in Britain.

Published record. VC 16: Blackheath, on palms, ix.1905 (*M. Putsch*) (Theobald, 1906).

***Planococcus citri* (Risso)** – citrus mealybug

Cosmopolitan; polyphagous; very common on indoor plantings throughout Britain since the 19th Century (Newstead, 1903; Theobald, 1906), occurs outdoors in sheltered situations during the summer.

Published records. VC 15: Dover, on *Hoya carnosa* from Belgium, ix.1982 (Seymour, Roberts & Davis, 1986a). VC 16: Lewisham, on *Cucumis sativus*, 18.v.1886 (H. T. Stainton) (Douglas, 1886c).

***Pseudococcus longispinus* (Targioni Tozzetti)** – long-tailed mealybug

Cosmopolitan; polyphagous; common pest on indoor plantings (particularly in public botanical collections) throughout Britain since the 19th Century (Newstead, 1903).

Published record. VC 16: South Darenth, on *Scindapsus aureus* from Jamaica, vi.1978 (Seymour & Kilby, 1978).

***Pseudococcus viburni* (Signoret)** – glasshouse mealybug

Cosmopolitan; polyphagous; very common on indoor plantings throughout Britain.

Published record. VC 15: Wye, on *Erythrina lysistemon* from Zimbabwe (Rhodesia), vi.1979 (Seymour & Kilby, 1979). **Collection data.** VC 15: Ashford, nursery, on *Euphorbia pulcherrima*, 8.xii.2008 (PHSI); Hawkhurst, nursery, on *Acacia longifolia* from Italy, 23.xi.2006, 6.xii.2006 (PHSI).

COCCIDAE – soft scale***Parasaissetia nigra* (Nietner)** – nigra scale

Occurs widely in tropical and subtropical areas; polyphagous; found in botanical collections in Britain; listed in the plant health legislation of the European Union (EU) (Malumphy, 2002).

RHS record. VC 16: Sevenoaks, on *Nerium oleander*, 8.viii.1995.

***Saissetia coffeae* (Walker)** – hemispherical scale

Occurs widely in tropical and subtropical areas; polyphagous; common on indoor plantings in Britain, especially ferns and orchids.

Published records. VC 15: Canterbury, on ferns and orchids, ii.1886 (G. S. Saunders) (Douglas, 1886b; Newstead, 1903). VC 16: Deptford, on *Adiantum capillus-veneris*, iv.1887 (W. Morris) (Douglas, 1888a) **RHS records.** VC 15: Dover, on *Hoya*, 9.vi.1992; Hythe, on *Nerium oleander*, 19.iii.1984; Maidstone, on *Peperomia*, 10.ii.1977. VC 16: Pembury, on Pteridophyta, 19.x.1998; Sevenoaks, on *Cymbidium*, 30.iv.1993; Royal Tunbridge Wells, on *Nerium oleander*, 23.iv.1982.

***Saissetia oleae* (Olivier)** – black scale

Occurs widely in tropical and subtropical areas; polyphagous; occurs widely on indoor plantings in Britain and has been found breeding outdoors in London.

Published records. VC 15: Dover, on *Olea europaea* from Greece, xi.1978 (Seymour & Kilby, 1978); Yalding (E. E. Green) (Newstead, 1903). **RHS records.** VC 15: Sittingbourne, 8.x.2007. VC 16: Lewisham, on *O. europaea*, 19.vii.2006; London, on *O. europaea*, 20.x.1999.

DIASPIDIDAE – armoured scales***Abgrallaspis cyanophylli* (Signoret)** – cyanophyllum scale

Cosmopolitan; polyphagous; occurs widely in Britain in botanical collections and occasionally found breeding outdoors in southern England.

Published record. VC 16: Meopham, on *Calathea picturata*, i.1976 (Seymour, 1978). **Collection data.** VC 16: Tonbridge, nursery, on *Leucospermum cordifolium* from Australia, 30.iv.2008 (PHSI).

***Aonidiella aurantii* (Maskell)** – Californian red scale

Occurs widely in tropical, subtropical and warm temperate areas; polyphagous, shows a strong preference for *Citrus*; ubiquitous on citrus fruit imported into Britain and occasionally detected on growing plants. Recently found breeding on *Dracaena* in a botanical collection in West Yorkshire.

Collection data. VC 16: Sevenoaks, wholesale, on *Citrus limon* plant from Italy, 19.ii.2008 (PHSI).

***Aspidiotus nerii* (Bouché)** – oleander scale

Cosmopolitan; polyphagous; occurs widely in Britain in botanical collections and occasionally found breeding outdoors in southern England.

Published records. VC 15: Canterbury, on *Aucuba* and *Dracaena*, ii.1886 (G. S. Saunders) (Douglas, 1886c). **RHS records.** VC 15: Beckenham, on *Howea forsteriana*, 1.ix.1988; Chatham, on Arecaceae, 10.x.1988. VC 16: Northfleet, on *Phoenix dactylifera*, 3.iii.1978; Royal Tunbridge Wells, on *Nerium oleander*, 23.iv.1982. **Collection data.** VC 15: Canterbury, nursery, on *Citrus*, 7.vi.2005 (PHSI); Hawkhurst, nursery, on *Acacia longifolia* from Italy, 23.xi.2006, 6.xii.2006 (PHSI).

***Diaspis boisduvalii* (Signoret) – boisduval scale**

Cosmopolitan; polyphagous; occurs widely in botanical collections in Britain.

Published record. VC 16: Paddock Wood, on *Rhapis excelsa* from Spain, xi.1983 (Seymour, Roberts & Kilby, 1985). **Collection data.** VC 15: Wye, nursery, on *Trachycarpus fortunei* from Italy, 5.vi.2007, 21.vi.2007 (PHSI).

***Hemiberlesia lataniae* (Signoret) – latania scale**

Cosmopolitan; polyphagous; occurs widely in Britain in botanical collections.

Published record. VC 16: South Darenth, on *Nerium* from India, iv.1976 (Seymour, 1978).

***Ischnaspis longirostris* (Signoret) – black thread scale**

Cosmopolitan; polyphagous; rare in botanical collections in Britain.

Collection data. VC 15: Wye college botanical collection, on *Ficus*, ix.1998 (C. Malumphy).

***Parlatoria proteus* (Curtis) – proteus scale**

Cosmopolitan; polyphagous; occasionally found in Britain in botanical collections.

Published record. VC 15: Maidstone, on orchids from Australia, ix.1977 (Seymour, 1978).

***Pinnaspis strachani* (Cooley) – lesser snow scale**

Occurs widely in the tropics, subtropics and warm temperate regions; polyphagous; recently found breeding on Arecaceae in a botanical collection in West Yorkshire.

RHS record. VC 16: London, Greenwich, on Arecaceae, 8.ix.2009.

***Pseudaulacaspis cockerelli* (Cooley) – false oleander scale**

Cosmopolitan; polyphagous; occasionally found in Britain in botanical collections.

Collection data. VC 16: Tonbridge, nursery, on *Callistemon phoeniceus*, *Callistemon viminalis* ‘red clusters’, *Callistemon* cv *subulatus* and *Melaleuca steedmanii* from Australia, various dates i.–iii.2009 (PHSI).

NON-ESTABLISHED INTRODUCTIONS

ORTHEZIIDAE – ensign scales

***Insignorthesia insignis* (Browne) – greenhouse orthezia**

Cosmopolitan; polyphagous; transient populations have occurred at several botanical collections in Britain but there is no recent evidence that it has established.

Published record. VC 16: Blackheath, on *Nerine*, vi.1906 (Theobald, 1907). **RHS record.** VC 16: Peckham Rye, on *Solenostemon*, 23.v.1939.

PSEUDOCOCCIDAE – mealybugs

***Phenacoccus avenae* (Borchsenius) – oat mealybug**

European; polyphagous, on roots, corms and rhizomes of various ornamental plants and inside the leaf sheaths of grasses.



PLATE 1. Fig. 1. Box tree moth *Cydalima perspectalis* (Walker) adult © RHS. Fig. 2. Box tree Moth *Cydalima perspectalis* (Walker) larva © RHS.



PLATE 2. Fig. 1. Adult female *Orthezia urticae* covered in wax plates. Fig. 2. Adult hermaphrodite *Icerya purchasi* with ovisac. Fig. 3. Adult female *Balanococcus kwoni*. Fig. 4. Young adult female *Phenacoccus aceris* on *Quercus*. Fig. 5. Young adult female *Luzulaspis luzulae* on *Luzula*. Fig. 6. Mature adult female *L. luzulae* completely enveloped in a cotton-like cover that protects the eggs (Fig. 1, © Gabrijel Seljak; Figs 2–6 David Crossley, Fera).



PLATE 3. Fig. 1. Adult female *Palaeolecanium bituberculatum* with dorsal tubercles on *Crataegus*. Fig. 2. Colony of *Parthenolecanium rufulum* on *Quercus*. Fig. 3. Adult female *Pulvinaria hydrangeae* with ovisacs on *Acer*. Fig. 4. Adult female *Pulvinaria regalis* with ovisacs on *Acer*. Fig. 5. Colony of *Cryptococcus fagisuga* on *Fagus*. Fig. 6. Mature adult female *Eriococcus greeni* completely enveloped in a felt-like sack on grass (Figs 1–6 © David Crossley, Fera).



PLATE 4. Fig. 1. *Chionaspis salicis* adult female scale covers on *Salix*. Fig. 2. *Diaspidiotus zonatus* female scale (left) and female body with cover removed (right) on *Quercus*. Fig. 3. *Dynaspidiotus britannicus* adult females causing chlorotic spotting on *Ruscus*. Fig. 4. *Euonymus* plant killed by huge infestation of *Unaspis euonymi* (left) which completely smothers the stems (right). Fig. 5. *Aleurotuba jelinekii* puparium (left) and adult (right) on *Viburnum*. Fig. 6. *Siphoninus phillyreae* puparia (left) and adult (right) on *Fraxinus*. (Figs 1–6 © David Crossley, Fera).

Published record. VC 15: Dover, on *Galanthus elwesii* from Turkey, x.1977 (Seymour, 1978, as *Phenacoccus* sp.).

***Phenacoccus hurdi* (McKenzie)** – Hurd's phenacoccus mealybug

Found in North and South America; oligophagous.

Collection data. VC 15: Canterbury, nursery, on *Psidium guajava* from the USA, 18.vi and 5.vii.2004 (PHSI).

***Planococcus ficus* (Signoret)** – Mediterranean vine mealybug

Pantropical and subtropical; polyphagous.

Published record. VC 16: Sidcup, on *Ficus benjamina* from Belgium, ii.1977 (Seymour, 1978).

DIASPIDIDAE – armoured scales

***Diaspis coccois* (Lichtenstein)** – cocos scale

Present in North and South America, Caribbean and the Mediterranean; polyphagous on Arecaceae. Some coccidologists consider *D. coccois* to be a junior synonym of *D. boisduvalii*.

Published record: VC 16: Paddock Wood, on *Rhapis excelsa* from Spain, xi.1983 (Seymour, Roberts & Kilby, 1985).

***Lepidosaphes conchyformis* (Gmelin)** – fig oystershell scale

Found in temperate areas worldwide; polyphagous, most common on *Ficus*; occasionally found in botanical collections in Britain.

RHS record. VC 15: Tenterden, on *Ficus carica*, x.1938.

***Lepidosaphes laterochitinsa* (Green)**

Present in Asia and the Pacific region; broadly polyphagous.

Collection data. VC 15: Folkestone, on *Codiaeum* sp. (Euphorbiaceae) imported from Sri Lanka, 9.iii.2009.

***Parlatoria* sp.**

There are several species of non-native *Parlatoria* that occur in India and the specimens were in poor condition, preventing identification to species.

Collection data. VC 15: Canterbury, nursery, on *Jasminum* from India, 28.ix.2004 (PHSI).

***Pseudaulacaspis pentagona* (Targioni Tozzetti)** – white peach scale

Found throughout the warmer areas of the world; polyphagous. Transient populations occurred in Kent on several *Catalpa bignonioides* trees grown outdoors for approximately four or five years; statutory action was taken to eradicate this pest. It has recently been found infesting *Prunus persicae* trees grown indoors in a botanical garden in Cornwall; control measures are being taken.

Collection data. VC 15: Ashford, private garden, on *Catalpa bignonioides* from Italy, 12.ix.2006, 13.vi.2007 (PHSI).

ALEYRODOIDEA – whiteflies

Seventeen species of Aleyrodidae were recorded (five native, six naturalised introductions, two introduced species established on indoor plantings and four non-established introductions on growing plants).

NATIVE AND INTRODUCED NATURALIZED SPECIES

In addition to the whitefly species below, there are slides of *Tetralicia ericae* Harrison deposited at the NHM labelled ‘?Kent, *Erica tetralix*, *E. E. Green*, Reference 197/62’. Bink-Moenen (1989) reviewed the whiteflies found on heather in Europe and published a distribution map but did not indicate *T. ericae* from Kent. *Tetralicia ericae* occurs widely in Britain, wherever *E. tetralix* occurs. Although it is likely to occur in Kent, its presence requires confirmation.

***Aleurochiton acerinus* (Haupt)** – field maple whitefly

Central Europe; feeds on *Acer campestre* (Martin *et al.*, 2000); only known from one location in Britain (Dolling & Martin, 1985).

Published record. VC 16: Polhill Down, on *Acer campestre* leaf litter, 21 and 27.v.1983 (Dolling & Martin, 1985).

***Aleurochiton aceris* (Modeer)** – Norway maple whitefly

Widespread in Europe; feeds on *Acer platanoides* (Martin *et al.*, 2000); locally common in southern England, where its presence was unproven until 1976 (Martin, 1978; Martin *et al.*, 2000).

Collection data. VC 16: Sevenoaks, on *A. platanoides*, 2009 (*A. Polazcek*).

***Aleurotuba jelinekii* (Frauenfeld)** – viburnum whitefly (Plate 4, Fig. 5)

European, introduced to North and South America; oligophagous on *Arbutus* and *Viburnum*; very common throughout England in urban areas.

All records are on *V. tinus*. **RHS records.** VC 15: Selling, 25.iv.1988. VC 16: Beckenham, 20.v.1988; Bromley, 25.iii.1974; London, 29.iii.1972; Tonbridge, 15.ii.1960. **Collection data.** VC 15: Bearsted (TQ8055), 22.iv.2011 (*C. Malumphy*); Bilting (TR0549), 24.iv.2011 (*C. Malumphy*); Ramsgate (TR3864), 24.iv.2011 (*C. Malumphy*); Selling (TR0456), 28.viii.2011 (*J. Badmin*); Sittingbourne (TQ9062), 1980 (*J. Badmin*); Tenterden (TQ8833), 20.vii.2011 (*J. Badmin*).

***Aleyrodes lonicerae* (Walker)** – honeysuckle or strawberry whitefly

European; polyphagous; common and widespread in Britain (Mound, 1966; Malumphy, 2010a & b), an occasional pest of honeysuckle and strawberry. This species is likely to be much more widespread and common in Watsonian Kent (particularly on *Fragaria*, *Lonicera* and *Rubus*) than the records below indicate.

Collection data. VC 15: Faversham, Lorenden Park, 18.vii.2011 (*S. Springate*); Herne Bay Downs, on *Lonicera*, 28.v.2011 (*R. Moyse & Springate*); Painter's Forstal, Badgin Wood (TQ0057), on *Lonicera*, 23.vii.2011 (*J. Badmin*); Perry Wood (TR0455), on *Lonicera*, 12.vii.2011 (*J. Badmin*); Selling (TR0456), on *Lonicera*, 10.vii.2011 (*J. Badmin*); Rainham, on *Lonicera*, 4.vi.2011 (*S. Springate*). VC 16: nursery, on *Euphorbia pulcherrima* from Germany, 10.ix.2010 (*PHSI*); Ide Hill (TQ4851), on *L. periclymenum*, 19.vi.2011 (*C. Malumphy*).

***Aleyrodes proletella* L.** – cabbage whitefly

European, spread to many other parts of the world; polyphagous, shows a preference for brassicas and *Chenopodium*; common and widespread throughout Britain (Mound, 1966; Malumphy, 2010a & b) and a frequent pest of *Brassica*.

Published records. VC 15: Frittenden and Selling, on *Brassica oleracea*, 1910 (Theobald, 1911). **Collection data.** All records on *B. oleracea*, unless specified otherwise. VC 15: Cliffe, 30.ix.2010 (*J. Shorter*); Doddington, 18.x.2009 (*R. Moyse*); Dover, 13.x.2009, 3.viii.2010 (*S. Springate*); Faversham, Lorenden Park, on *Lactuca serriola*, 18.vii.2011 (*S. Springate*); Folkestone Warren, 29.vii.2009 (*S. Springate*); Grain, 9.x.2009 (*S. Springate*); Kingsdown, 5.vi.2010 (*S. Springate*); Rainham,

2.vi.2009 (*S. Springate*); Ramsgate, 25.iv.2011 (*S. Springate*); St Margarets at Cliffe, 5.vi.2010 (*S. Springate*); Samphire Hoe, 13.x.2009 (*S. Springate*); Selling (TR0456), 6.iv.2011 (*J. Badmin*); Sheldwich (TR0157), on *Chenopodium*, 6.iv.2011 (*J. Badmin*); South Foreland, 13.x.2009 (*S. Springate*); Staplehurst, nursery, on *Euphorbia pulcherrima* from Germany, 15.x.2010 (PHSI); Swanley, 20.x.2010 (*S. Springate*); Tankerton, 23.x.2009 (*S. Thompson*); Worth, 24.iv.2009 (*S. Springate*). VC 16: Borough Green (TQ6057), on *Sonchus*, 22.iv.2011 (*C. Malumphy*); Dartford, on *Euphorbia pulcherrima* from The Netherlands, 9.xi.2006 (PHSI); Four Elms (TQ4648), on *Sonchus*, 19.vi.2011 (*C. Malumphy*); Luddesdown, 4.v.2008 (*S. Springate*); Pembury, 14.ix.2009 (*C. Wallwork*).

***Asterobemisia carpini* (Koch) – hornbeam whitefly**

European; polyphagous, particularly on Rosaceae (Martin *et al.*, 2000); widespread but rarely recorded in Britain. Early instar whitefly larvae suspected to be this species were found at a commercial nursery (VC 16), on *Corylus avellana*, 12.ix.2007 (PHSI).

Published records. VC 16: Bexley, on *Carpinus betulus*, 28.v.1881 (Douglas, 1895); Blackheath, on *Rubus*, 15.vi.1891 (Douglas, 1891b). **NHM.** VC 16: Bexley wood, on *Lonicera*, 9.vi.1867 (*J. Douglas*).

***Massilieuodes chittendeni* (Laing) – rhododendron whitefly**

Asian; feeds on *Rhododendron*. Locally common in southern England, rarely recorded.

Collection data. VC 15: Saltwood, nursery, on *Rhododendron*, 12.vi.2007 (PHSI).

***Pealius azaleae* (Baker & Moles) – azalea whitefly**

East Asian, introduced to Europe, North America, the Middle East, Australia and New Zealand; feeds on *Rhododendron*; only been recorded from a small number of locations in south east England.

RHS records. VC 15: Folkestone, on *Rhododendron* (azalea), 4.ii.1991. VC 16: Hawkhurst, on *R. macranthum*, 29.xi.1968.

***Pealius quercus* (Signoret) – oak whitefly**

European; oligophagous on Betulaceae and Fagaceae; rarely recorded in Britain.

Published record. VC 15: Wye, *Quercus*, 1932 (Trehan, 1940). **Collection data.** VC 15: Ambley Wood (TQ7965), on *Quercus robur* (1 puparium), 16.x.2011 (*S. Springate*); Blean Wood (TR0861), on *Carpinus betulus* (not a confirmed host as only one adult found) and *Quercus robur* (20+ adults and eggs), 25.iv.2011 (*C. Malumphy*).

***Siphoninus immaculatus* (Heeger) – ivy whitefly**

Central and northern Europe, and Iran; monophagous on *Hedera*; rarely recorded in Britain, an occasional pest of ornamental ivy (Malumphy, 2010a).

NHM. VC 16: Dunton Green, on *H. helix*, iii.1981 (*W. R. Dolling*).

Collection data. VC 15: Blean Wood (TR0861), on *H. helix*, 25.iv.2011 (*C. Malumphy*).

***Siphoninus phillyreae* (Halliday) – ash whitefly (Plate 4, Fig. 6)**

Mediterranean species that has spread to many other parts of the World, including southern England; polyphagous; rarely recorded in Britain (Mound, 1966; Malumphy, 2010c). Malumphy (2010c) recorded it damaging ornamental olive plants in a glasshouse in Hampshire.

NHM. VC 16: Beckenham, on *Pyrus communis*, x.1950 (*C. B. Williams*), and *Fraxinus excelsior*, 2.x.1988 (*J. H. Martin*).

INTRODUCED SPECIES ESTABLISHED ON INDOOR PLANTINGS

***Aleurothrix floccosus* (Maskell)** – woolly whitefly

Present throughout the warmer parts of the World, restricted to indoor plantings in cooler regions; polyphagous, most common on *Citrus*; restricted to a small number of indoor botanical collections in Britain.

Collection data. VC 15: Ashford, botanical collection, on *Citrus*, ix.1998 (*C. Malumphy*).

***Trialeurodes vaporariorum* (Westwood)** – glasshouse whitefly

Cosmopolitan; polyphagous; widespread and very common throughout Britain on indoor plantings, and breeds outdoors during the summer. Theobald (1906) recorded whiteflies feeding on *Ageratum* and *Bouvardia* in Blackheath (VC 16), iii.1905, which are almost certainly this species.

Published records. VC 15: Cranbrook, on *Vaccinium* from the Netherlands, xi.1985 (Seymour, Davis & Roberts, 1986b). **RHS records.** The large number of records have been summarised here. VC 15: Acrise Place, Ashford, Bearsted, Broadstairs, Canterbury, Chart Sutton, Chislehurst, Cranbrook, Eastling, Gillingham, Maidstone, Minster, Old Wives Lees, Ramsgate, Sandwich, Shepherdswell, Sittingbourne, Smarden, Tenterden. VC 16: Beckenham, Bermondsey, Biggin Hill, Bromley, Chelsfield, Dartford, Edenbridge, Eynsford, Farningham, Gravesend, Hayes, Hever Castle, Hildenborough, Horsmonden, Kemsing, Keston, London, Orpington, Rochester, Royal Tunbridge Wells, Sevenoaks, Sidcup, Swanley, Tonbridge, West Wickham, on *Abutilon*, *Arum*, *Brassica*, *Brunfelsia*, *Capsicum*, *Cucumis sativus*, *Datura*, *Fuchsia*, *Geranium*, *Gerbera*, *Lantana*, *Lonicera*, *Pelargonium*, *Solanum lycopersicum*, *Sparmannia africana*, *Tagetes* and unidentified plants from 1949 onwards. **Collection data.** VC 15: Sutton Valence and Staplehurst, nurseries, on *Euphorbia pulcherrima*, 28.ix.2007, 25.x.2007 (*PHSI*).

NON-ESTABLISHED INTRODUCTIONS

***Bemisia tabaci* (Gennadius)** – tobacco whitefly

There is increasing biological and molecular evidence to support the hypothesis that *tabaci* is a complex of cryptic species (De Barro *et al.*, 2011). It is the most geographically widespread, polyphagous, and economically important whitefly pest (group) in the world and is listed in the plant health legislation of the EU. All interceptions on growing plants and incursions on indoor plantings of *B. tabaci* have been, or are being, eradicated under the direction of Fera.

Published records. VC 15: Ashford, on *Cucumis sativus* from Oman, xi.1978 (Seymour & Kilby, 1978). VC 16: East Malling, Oaken Wood, on *Veronica* (outdoors), 30.vii.1943 (*A. M. Masee*) (Mound, 1966). **Collection data.** It has been found on *Euphorbia pulcherrima* imported from Germany, Netherlands and Portugal, and on *Psidium guajava* from the USA, at warehouses and plant nurseries throughout VC 15 and 16.

***Orchamoplatus mammaeferus* (Quaintance & Baker)** – croton whitefly

Widespread in Asia, Caribbean, USA and Iran; polyphagous.

Collection data. VC 15: Folkestone, on *Codiaeum variegatum* from Sri Lanka, 9.iii.1999 (*PHSI*).

***Dialeurodes kirkaldyi* (Kotinsky)** – Kirkaldy whitefly

Found throughout the warmer parts of the World; polyphagous.

Collection data. VC 15: Canterbury, nursery, on *Jasminum* from India, 22–28.ix.2004 (PHSI).

***Dialeurodes vulgaris* (Singh)**

Recorded from India and Iran; polyphagous; a pest of Jasmine.

Collection data. VC 15: Canterbury, nursery, on *Jasminum* from India, 22–28.ix.2004 (PHSI).

DISCUSSION

Seventy-nine species of Coccoidea and 17 species of Aleyrodidae are recorded from Watsonian Kent. Eleven species of scale insect and seven species of whitefly are recorded outdoors in Watsonian Kent for the first time, including *Balanococcus kwoni*, an Asian mealybug new for Britain.

The percentages of scale insect and whitefly species present in Watsonian Kent (including those on indoor plantings and outdoors) that are non-native introductions are 52% and 58%, respectively. This compares with the European average of 30% for scale insects (Pellizzari & Germain, 2010) and 39% for whiteflies (Misfud *et al.*, 2010). A likely reason that the percentages are higher for Watsonian Kent is due in part to Mediterranean species being regarded as non-native in Kent (they are excluded from the work by Pellizzari & Germain (2010)), and in part to the fauna having been more comprehensively studied in the county than in most other areas of Europe.

Most of the non-native scale insect and whiteflies introductions into Kent are likely to have been human-assisted, that is, accidentally brought in on imported plants. Smith *et al.* (2007) highlighted the predominant role of the ornamental plant trade in introducing new plant pests to the European continent. Even those species that are native to southern Europe and the Mediterranean are likely to have been introduced with plant trade, as they have a relatively low natural dispersal potential (adult female scale insects are neotenic, and adult whiteflies are poor fliers). Other factors, however, including natural expansion and range expansions driven by climate change, may have played a minor role. Range expansions within Britain are likely to continue to occur both as a result of climate change and passive dissemination by man, resulting in the spread and increased abundance of many of these species, which are often at the northern limits of their distributions in the UK (Cannon, 1998).

Forty-four per cent of the non-native scale insect species found outdoors in Watsonian Kent are native to Asia and 31% are native to the Mediterranean region. The corresponding percentages for non-native whiteflies in Kent are 60% from Asia and 40% from the Mediterranean region.

Invasive non-native species (animals and plants) are estimated to cost the British economy at least £1.7 billion per annum (Williams *et al.*, 2010) and non-native arthropods alone cause yield losses of £609 million per year for the British Isles, since each year arthropods damage or destroy approximately 10% of the crops, and 30% of these pests are of exotic origin (Pimentel, 2002). Approximately a third (16 spp.) of the scale insect species found outdoors in Watsonian Kent are non-native introductions (Table 1), all of which feed on cultivated, mainly non-native, woody plants, and therefore have a potential direct economic impact. Invasive scale insects have had a major detrimental impact on agriculture in some countries, e.g. USA (Miller *et al.*, 2005). None of the introduced species of scale insect, however, has had a discernible negative impact on native biodiversity, ecosystems or forestry in

Table 1. Non-native scale insects and whiteflies (Hemiptera: Coccoidea and Aleyrodoidea) naturalised in Watsonian Kent, England

FAMILY Species	Origin	Introduction date to UK; Refs.	Main hosts in Britain	Distribution in UK	Impact
ALEYRODIDAE					
<i>Aleurochiton aceris</i>	Europe	1976; Martin, 1978	<i>Acer platanoides</i>	S. England	None
<i>Aleurochiton acerinus</i>	Europe	1983; Dolling & Martin, 1985	<i>Acer campestre</i>	Single location in Kent	None
<i>Aleurotuba jelinekii</i>	Mediterranean	1936; Mound, 1962	<i>Viburnum tinus</i>	Widespread	Occasional, sooty mould
<i>Massilieuodes chittendeni</i>	Northern Asia	1928; Laing, 1928	<i>Rhododendron</i>	Local in S. England	Rare, minor
<i>Pealius azaleae</i>	Eastern Asia	1930s: Mound, 1966	<i>Rhododendron</i>	Local in S.E. England	Rare, minor
<i>Siphoninus phillyreae</i>	Mediterranean	?early 20th C.; Mound, 1966	Polyphagous, <i>Crataegus</i> , <i>Fraxinus</i> , <i>Olea</i>	Local in S. England	Rare, sooty mould
COCCIDAE					
<i>Coccus hesperidum</i>	Tropical	1843; Curtis, 1843	Polyphagous, <i>Hedera</i> , <i>Ilex</i> , <i>Laurus</i>	Widespread	Occasional leaf loss and dieback
<i>Eulecanium excrescens</i>	Asia	1998; Malumphy, 2005	Polyphagous, <i>Wisteria</i>	Greater London, spreading	Occasional die-back
<i>Parthenolecanium persicae</i>	?Mediterranean	1940s; Boratynski & Williams, 1964	Polyphagous, <i>Vitis</i>	Widespread	Occasional pest, sooty mould
<i>Parthenolecanium pomericum</i>	Europe	1928; Green, 1930	<i>Taxus baccata</i>	Widespread	Occasional dieback
<i>Pulvinaria floccifera</i>	Asia – temperate	1886; Douglas, 1886b	Polyphagous, <i>Ilex</i> , <i>Rhododendron</i> , <i>Taxus</i>	Widespread	Frequent serious pest, sooty mould, leaf loss, dieback
<i>Pulvinaria hydrangeae</i>	Asia – temperate	1987; Halstead, 1992	Polyphagous, <i>Hydrangea</i> , <i>Viburnum</i>	Widespread	Disfigures plants with waxy ovisacs
<i>Pulvinaria regalis</i>	Asia – temperate	1964; Canard, 1968	Polyphagous, <i>Acer</i> , <i>Aesculus</i> , <i>Tilia</i> , <i>Ulmus</i>	Widespread	Disfigures plants with waxy ovisacs
DIASPIDIDAE					
<i>Aulacaspis rosae</i>	Mediterranean	1880s; Douglas, 1887b	<i>Rosa</i> , <i>Rubus</i>	Local, southern England	Occasional dieback
<i>Carulaspis juniperi</i>	Mediterranean	?1950s; Boratynski, 1957	Cupressaceae	Common, S. England	Occasional severe chlorosis
<i>Carulaspis minima</i>	Mediterranean	1898; Newstead, 1900, 1901	Cupressaceae	Common, widespread	Occasional severe chlorosis
<i>Diaspidiotus pyri</i>	Mediterranean	1916; Boratynski & Williams, 1964	<i>Prunus</i> , <i>Pyrus</i> , <i>Malus</i>	Locally abundant in S. England	Occasional leaf loss, dieback, disfigures fruit
<i>Dynaspidiotus britannicus</i>	Asia	1896; Newstead, 1901	<i>Buxus</i> , <i>Ilex</i>	Local	Occasional severe chlorosis
<i>Unaspis euonymi</i>	Eastern Asia – temperate	1950s; Dennis, 1969	<i>Euonymus</i>	Widespread	Leaf loss, dieback, regularly kills plants
MONOPLEBIDAE					
<i>Icerya purchasi</i>	Australia	1996; Watson & Malumphy, 2004	Polyphagous, <i>Acacia</i> , <i>Citrus</i> , <i>Laurus</i> , <i>Pittosporum</i>	Greater London	Occasional leaf loss, dieback and rarely death
PSEUDOCOCCIDAE					
<i>Balanococcus diminutus</i>	New Zealand	1970s; Bartlett, 1981	<i>Phormium tenax</i>	Widespread	Occasional dieback and rarely death
<i>Balanococcus kwoni</i>	South Korea	1990s; recorded here	bamboo	Widespread	Disfigures plants with wax

Watsonian Kent (or elsewhere in Britain). There may, however, be long-term impacts due to progressive debilitation caused by infestations, or changes in host range and phenology, that have so far not been observed, but which have been recorded for other introduced insects. There is no evidence of direct competition between non-native introduced species and native species although several species share the same hosts (particularly in the Rosaceae). Only one species, *Diaspidiotus pyri*, has been reported to be an occasional minor pest of deciduous fruit trees (especially apple) in Kent (Boratynski, 1977). It can lower the market value of produce by causing uneven ripening (spotting) and discolouring of fruit. There is, however, very little published on the economic importance of *D. pyri* in Britain, and it appears to be far less damaging to fruit trees and occurs less frequently on fruit than the native *Lepidosaphes ulmi* (the latter is commonly found on Kentish apples for sale in the UK, although they are completely harmless to human health). On rare occasions the presence of non-native scale insects (for example, *Parthenolecanium pomericum* and *P. floccifera* on *Taxus*) on plants at a commercial nursery has prevented the PHSI from issuing a plant passport to allow plants to be exported (Fera, unpublished data). This can result in considerable costs to an individual nursery.

Non-native scale insects do have an economic impact on plants in urban areas (gardens, parkland, amenity areas and roadsides) where they are often more abundant and damaging than native scale insect species. For example, 70% of the scale insect species submitted to the RHS Advisory Services from RHS members in Kent during 2010 were non-native (Andrew Salisbury, RHS, pers. comm., 2011). All of the non-native species found in Kent have occasionally been recorded causing serious damage (leaf loss, dieback and even death), usually to individual plants in urban areas, in England. The most common scale insects in urban areas in Kent are *Pulvinaria floccifera* and *P. regalis*, followed by *P. hydrangeae* and *Unaspis euonymi*, all suspected to be Asian in origin. *Pulvinaria* species cause a loss of aesthetic appeal to ornamental and amenity plants due to the conspicuous waxy ovisacs and the black sooty moulds that grow on the sticky honeydew excreted by the scales. Mature trees, however, can withstand enormous populations of *Pulvinaria* scales, although they are likely to have reduced vigour over time. The frequency of *P. floccifera* and *P. regalis* can be demonstrated by the fact that they were the third and eighth most commonly reported garden pests to the RHS Members' Advisory service during 2010. They are also the scale insect species that members of the public report most frequently to Fera. Individual *Euonymus* plants, and occasionally whole *Euonymus* hedges, suffer serious dieback and may be killed by large infestations of *U. euonymi*. *Aulacaspis rosae* is an occasional pest of roses in southern England but also has the potential to be a pest of deciduous fruit trees (Kozár, 1990). *Carulaspis juniperi* and *C. minima* are widespread and common in southern England and can cause serious chlorosis to Cupressaceae. *Balanococcus diminutus* is an occasional pest of *Phormium tenax*, killing susceptible plants (Malumphy, 2009b). *Eulecanium excrescens* is a pest of *Wisteria* and is spreading in South East England (Salisbury, Halstead & Malumphy, 2010). *Icerya purchasi* is a serious polyphagous pest of indoor plantings throughout Britain and outdoors in London (especially of *Laurus nobilis*) (Watson & Malumphy, 2004). *Parthenolecanium persicae* is an occasional pest of *Vitis vinifera* and *Prunus* sp. growing in sunny sheltered situations, such as against a southern facing wall, but it has not yet been recorded as a pest in commercial vineyards or orchards in Britain.

Non-native scale insects incur costs in terms of insecticides (and biocontrol agents on indoor plantings), replacement of plants, and lowering the market value of ornamentals and produce. There is, however, no detailed information available to

determine the economic impact due to introduced non-native scale insects, either in Kent or in the rest of Britain. The cost will inevitably vary from year to year as the scale insect populations fluctuate. The social (e.g. aesthetic) impacts are harder to quantify, but are likely to be important, particularly for gardeners if their plants suffer severe damage or are killed.

Very high levels of mortality (90–99%) were observed in large populations of *P. regalis* in Ramsgate during April 2011 due to a naturally occurring entomopathogenic fungus *Lecanicillium* sp. (*Hypocreales: Clavicipitaceae*). The fungus was also observed attacking other coccid species (native and non-native) including *P. floccifera*, *P. vitis* and *L. viburni*. The author has observed *Lecanicillium* sp. causing similar high levels of mortality to coccids in several locations throughout England and it has also been observed causing high levels of mortality to *P. regalis* in Cardiff, Wales (C. Hodgson, pers. comm., 2011).

It is possible that some non-native introduced scale insects may be beneficial for biodiversity as they provide food directly for native insectivorous species (e.g. Coccinellidae, Chrysopidae and birds), or indirectly by excreting honeydew on which native insects may feed (e.g. Formicidae, Apiidae, and Syrphidae), although this thesis requires further investigation.

Approximately half of the whitefly species found outdoors in Kent (six spp.) are non-native introductions (Table 1). Although some of the introduced whiteflies have become occasional, local, minor pests (often of individual ornamental woody plants in urban gardens), none of them have had a significant impact to biodiversity, ecosystems, forestry, crops or urban plantings. *Aleurotuba jelinekii* is the most common naturalised whitefly in urban areas in England, but only feeds on *Arbutus unedo* and *Viburnum tinus*. It frequently occurs in enormous numbers, but appears to have little or no detrimental impact. It is possible, however, that the impact and distribution of introduced non-native whiteflies could change as a result of climate change (Hellmann *et al.*, 2008).

One likely reason that non-native scale insects are more frequent than native scales in urban areas is that their non-native host plants are commonly planted. For example, 70% of all plant species found in gardens in cities located throughout the UK are non-native and the majority (66%) of the 50 most commonly recorded species (including weeds) are non-native (Loram *et al.*, 2008). Fifteen (30%) of the 50 plant species most frequently found in UK city gardens are host plants for non-native scale insect and whitefly species naturalized in Kent (see Table 2) (Loram *et al.*, 2008). The non-native plants *Laurus nobilis*, *Prunus* spp., *Rhododendron* spp. and *Rosa* spp. are host to four or more of the non-native scale insect and whitefly species naturalised in Kent.

The abundance of non-native scales in urban areas may also be due to factors such as pollution affecting host stress and susceptibility. For example, Alford, Cronin & Ponsonby (1998) investigated *Pulvinaria regalis* on *Acer*, *Aesculus* and *Tilia* in rural and urban areas of Kent and South London related to environmental factors such as stress due to poor growing conditions, traffic volume and nitrogen dioxide levels. A significant positive relationship was found between the mean scale insect infestation levels and the maximum monthly NO₂ levels.

Moraal & Jagers op Akkerhuis (2011) stated that *P. hydrangeae* and *P. regalis* feed exclusively on trees in cities in the Netherlands. This is not true in Kent or elsewhere in Britain (and very unlikely in the Netherlands) where *P. regalis* is common in rural areas in gardens, roadsides and natural habitats, particularly on *Acer pseudoplatanus*. It occurs, however, at much lower densities than observed in cities and is therefore much more difficult to detect. *Pulvinaria hydrangeae* also occurs in rural areas but is

less common, probably due to its preferred hosts being less commonly available. *Pulvinaria floccifera* is common and widespread in rural areas, both in gardens and in natural habitats, wherever its preferred hosts *Ilex* and *Rhododendron* are found.

The detrimental economic impact of non-native scale insects and whiteflies to indoor plantings in Britain, to ornamentals and vegetable crops, is far more significant. For example, *Coccus hesperidum* and *Trialeurodes vaporariorum* are among the most common pests of indoor plants throughout Kent (and the rest of Britain) and frequently require control measures. *Coccus hesperidum* is also widely naturalised and *T. vaporariorum* occurs commonly outdoors during the summer but populations rarely develop to damaging levels. There are also three species of mealybug which are very common and widespread on indoor plantings throughout Britain: *Planococcus citri*, *Pseudococcus longispinus* and *P. viburni*. The UK has protected zone (PZ) status against the quarantine-listed whitefly *Bemisia tabaci*. The costs to the horticultural industry of maintaining the PZ status are considerable; for example, the pest management costs alone of eradicating an outbreak of *B. tabaci* at an ornamental nursery range between £81 and £321 per 0.1 ha, depending on whether biological control agents are used. Cost-benefit ratios calculated in 2010, however, favour maintaining the current PZ status (Fera, 2010).

The importance of Watsonian Kent, in terms of monitoring introduced non-native species, may be demonstrated by the fact that it is the only county in Britain where the following non-native species have been recorded breeding outdoors: *Aleurochiton acerinus*, *B. tabaci*, *Pseudaulacaspis cockerelli* and *P. pentagona*. *Aleurochiton acerinus* feeds exclusively on *Acer campestre* and is only recorded from a single location in Britain (Polhill Down). *Bemisia tabaci* is an economically important worldwide pest, a vector of more than 111 plant pathogenic viruses, and listed in the top 100 of the worst non-native invasive species in Europe (<http://www.europe->

Table 2. A list of non-native plants commonly found in urban gardens in the UK that are hosts for non-native scale insect and whitefly species found in Watsonian Kent

Host family	Host species	Scale insect and whitefly species
Celastraceae	<i>Euonymus fortunei</i>	<i>Unaspis euonymi</i>
Cupressaceae	<i>X Cupressocyparis leylandii</i>	<i>Carulaspis juniperi</i> , <i>C. minima</i>
Ericaceae	<i>Rhododendron</i> spp.	<i>Coccus hesperidum</i> , <i>Massilieuodes chittendeni</i> , <i>Pealius azaleae</i> , <i>Pulvinaria floccifera</i>
Hydrangeaceae	<i>Hydrangea macrophylla</i>	<i>Pulvinaria hydrangeae</i>
Lamiaceae	<i>Rosmarinus officinalis</i>	<i>Coccus hesperidum</i>
Lauraceae	<i>Laurus nobilis</i>	<i>Coccus hesperidum</i> , <i>Dynaspidotus britannicus</i> , <i>Icerya purchasi</i> , <i>Pulvinaria regalis</i>
Oleaceae	<i>Forsythia</i> × <i>intermedia</i>	<i>Parthenolecanium persicae</i>
Onagraceae	<i>Fuchsia</i> spp.	<i>Coccus hesperidum</i>
Ranunculaceae	<i>Clematis</i> spp.	<i>Coccus hesperidum</i> , <i>Parthenolecanium persicae</i>
Rosaceae	<i>Fragaria</i> × <i>ananassa</i>	<i>Aulacaspis rosae</i>
	* <i>Cotoneaster</i> spp.	<i>Coccus hesperidum</i> , <i>Icerya purchasi</i> , <i>Siphoninus phillyreae</i>
	<i>Malus domestica</i>	<i>Diaspidiotus pyri</i> , <i>Pulvinaria hydrangeae</i> , <i>P. regalis</i> , <i>Siphoninus phillyreae</i>
	* <i>Prunus</i> spp.	<i>Coccus hesperidum</i> , <i>Diaspidiotus pyri</i> , <i>Dynaspidotus britannicus</i> , <i>Icerya purchasi</i> , <i>Parthenolecanium persicae</i> , <i>Pulvinaria floccifera</i> , <i>P. hydrangeae</i> , <i>Siphoninus phillyreae</i> , <i>Unaspis euonymi</i>
	* <i>Rosa</i> spp.	<i>Aulacaspis rosae</i> , <i>Coccus hesperidum</i> , <i>Icerya purchasi</i> , <i>Pulvinaria floccifera</i> , <i>P. regalis</i>
Sapindaceae	<i>Acer palmatum</i>	<i>Pulvinaria regalis</i>

*Native plant species assigned to these genera are excluded from this study

aliens.org/speciesTheWorst.do). It has only been recorded breeding outdoors once (transient population) in Britain (Oaken Wood, VC 16) and it is not currently established in Britain. *Pseudaulacaspis cockerelli* is an important pest of ornamental plants in the Mediterranean region and is currently only known to be established on indoor plantings at a single botanical garden in Britain. It has only been recorded breeding outdoors once in Britain (at a commercial plant nursery in VC 16). *Pseudaulacaspis pentagona* is a major pest of ornamental plants and some fruit trees in Europe and is not currently established in Britain (control measures are currently being taken against a single incursion on peach trees grown indoors in Cornwall), it has been recorded breeding outdoors at a single location in Britain (at a private garden in VC 15).

The frequency of non-native scale insects and whiteflies in Kent has increased during the last century. For example, Green (1895) studied the coccoid fauna in great detail around Bearsted in the 1890s where he found one non-native introduced species outdoors (*Aulacaspis rosae*). The first author found four non-native species (*Carulaspis juniperi*, *Parthenolecanium pomeranicum*, *Pulvinaria floccifera* and *P. regalis*), during a brief visit to Bearsted in April 2011. *Pulvinaria regalis* was by far the most widespread and common species of the scale insects observed. The only whitefly found was the non-native *Aleurotuba jelinekii*.

Non-native scale insects and whiteflies will inevitably continue to be accidentally introduced to Watsonian Kent and some will become naturalised. There are two Asian species which occur widely in continental Europe that could potentially have a greater detrimental impact, if they become naturalised in Kent, than previous non-native introductions. The San José scale *Diaspidiotus perniciosus* (Comstock) and *Pseudaulacaspis pentagona* (see above). *Diaspidiotus perniciosus* is a broadly polyphagous, destructive pest of deciduous fruit trees which could establish in the UK and on rare occasions become a serious pest in Kentish orchards, although the impact is likely to be negligible in most years (MacLeod, 2009). The unregulated movement of many of their host plants within the EU provides a pathway of introduction and it may be only a matter of time before they become naturalised in Kent and elsewhere in Britain.

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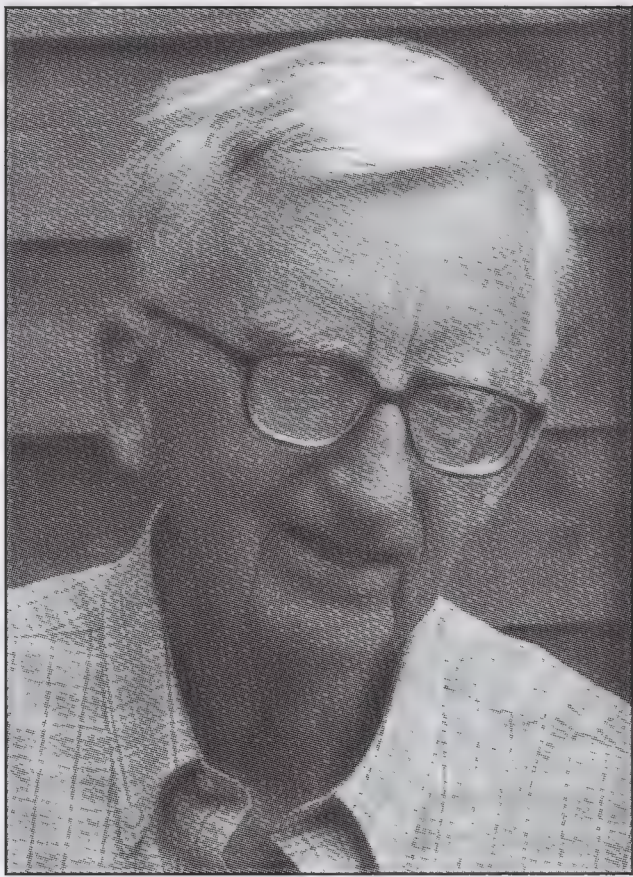
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OBITUARY



RONALD MALCOLM PAYNE
1922–2010

Ron Payne, the Society’s second longest-serving member, died on 2 December 2010 aged 88. He joined the ‘South London’ as it was then in 1940 and had wide interests in both entomology and botany, starting in his teens with Coleoptera. He then took up Odonata and Orthoptera, and concentrated on Diptera from 1960 to the 1980s. His life-long botanical interests then prevailed and he became an acknowledged authority on grasses.

Ron was born on 9 June 1922 in Balham, South London, the only child of Lawrence and Winifred Payne, and the family moved to Richmond in 1926. He was educated at Broomfield House private school in Kew and at East Sheen County School. His father Lawrence Gilbert Payne (1893–1949), a botanist specialising in ferns, was active in the London Natural History Society from 1923, and became its President in 1946–1948; two uncles were also naturalists but there had been no previous interest in entomology in the family. Ron related (Payne, 1967a) how he had become an entomologist at the age of 17, even though he had not been much interested in natural history as a child, despite the family influences. However, when an uncle gave him a copy of *Common British Beetles* by Revd C. A. Hall, this awakened his interest and started him on Coleoptera, encouraged by finding the dung beetle *Typhoeus* at the mouth of a rabbit hole on Ham Common, Surrey.

An interest in beetles was then also taken up by Ron’s father and they built up a joint collection during the 1940s, according to Dallas (1949). Both were involved with the survey of Bookham Common, Surrey, which has been a major project of the London Natural History Society for many years. Lawrence Payne (1945) contributed an article on the beetles of the common, published in the same issue of the journal as Ron’s paper on the Odonata of this site (Payne, 1945b) and a posthumous note on the Common later appeared (L. G. Payne, 1955). Ron commented (Payne, 1967a) that he later had to dispose of his beetle collection, but he returned to an interest in beetles later in life, as shown by three notes contributed to *The Coleopterist* (Payne, 2004a, 2005e, 2007a).

Another early interest was the Orthoptera. He searched for these insects in many parts of Britain but failed in one notable instance, when looking for the Sickie-bearing Bush-cricket, *Phaneroptera falcata*, in suitable habitat at the locations in west Cornwall where it had been recorded on two occasions in the early 1880s (Lucas, 1920). Few people write up negative records, but Ron published this experience as “A disappointing day at Porthgwarra” (Payne, 1969b). Forty years later, this note provided useful evidence that recent records of this species in south-east England represent fresh colonisation (Collins *et al.*, 2007). Closer to home, Ron wrote the important paper on “The distribution of grasshoppers and allied insects in the London area” (Payne, 1958c), including many of his own records, particularly from Essex. This provides a useful base-line against which to view the changes in distribution since then, both declines and remarkable increases, but many species can still be found at the same locations today. In middle age Ron’s ability to hear high-pitched sounds faded away, taking with it this interest. “Orthoptera, that’s a young man’s game”, he declared in 1980, “I cannot hear them any more”. In a generous gesture, he then passed on his small but comprehensive library of Orthoptera books to Roger Hawkins who was at that time a novice entomologist with good hearing and a passion for grasshoppers and crickets.

Ron’s career was in the civil service, in which he rose through the grades after joining the Board of Trade in 1939. He was not called up for active service in the Second World War as he had a heart weakness, but he was in the Home Guard. During the war he spent three years in Leicester, where he contributed notes on the local dragonflies (Payne, 1944a, 1945a) and subsequently the Orthoptera (Payne, 1946). He returned to London and married Sheila Groves, a fellow civil servant, in 1948. From the early 1950s they lived at Loughton in Essex where their two daughters Maggie and Heather were born. Ron was particularly active in the London Natural History Society, which he joined in 1942; he served on that Society’s Council from 1948 to 1953 and for longer periods on the Entomology, Botany, Nature Conservation and Epping Forest Field Section committees. He was editor of the *London Naturalist* for 15 years from 1952 to 1967, and was made an Honorary Vice-President of the London Natural History Society in 1967 when moving away from London had precluded further involvement in the Society.

It was while at Loughton that Ron began an interest in Diptera. He started to publish on this order in 1960, and it is apparent from his publications that his interest at first centred on the crane flies, on which he gave accounts of his finds on holiday tours of various districts (Payne, 1960b, 1961, 1963, 1964a, 1965a, 1966a). This led to contact with Alan Stubbs, who was becoming interested in crane flies at that time, and Alan has acknowledged that Ron’s help and encouragement set him on the path to making crane flies a major interest. A good start was made in this by a collecting trip to Wales in June 1966, which resulted in a joint publication (Payne & Stubbs, 1967b). Ron also studied the crane flies of his local area, producing lists for Thorndon Park and Epping Forest (Payne, 1967d, 1968a), the latter including nearly 100 species.

Ron worked in London until 1966 when he moved to the Investments Grants office in Cardiff. He then lived at Dinas Powis, and in May 1968 he arranged a field trip for London dipterists to spend a few days collecting in a range of sites in nearby parts of South Wales. This was attended by Alan Stubbs, Raymond Uffen and Peter Chandler, with local support from Adrian Amsden, a parasitic hymenopterist then at the Cardiff Museum. It was the experience of this event, as well as his previous Welsh trip with Ron, that convinced Alan to start Diptera field meetings of several days’ duration, which he began in 1973 under the Crane fly Recording Scheme and which have continued so successfully ever since.

The stay in Wales was brief, as on 19 February 1969 he received a promotion to CEO and moved back to Essex to work in the Customs and Excise office at Southend; the family then lived at Westcliff-on-Sea. This part of Essex is relatively unexciting for craneflies and Ron turned more to hoverflies, producing a detailed account of the hoverflies of the county (Payne, 1975a). Also at this time he developed an interest he had begun earlier (Payne, 1966c) in the species of flies visiting flowers and he produced a series of papers recording the flower visitors of particular plants (Payne, 1975b, 1975c, 1979a, 1981, 1984a). While at Westcliff Ron was active in both the Essex Field Club and the South Essex Natural History Society. In 1975 he was elected to the Council of the latter Society; he became its Vice Chairman and was Chairman for a while in 1978.

In 1978 Ron and Sheila moved to East Harptree in the Mendips when he took up the post as Deputy Collector of VAT for the West Country. While there he joined the Bristol Naturalists' Society and became President of the Society, of the Entomology section and of the Botany section simultaneously – the first person to do this. During his stay in the Mendips Ron's interests began to turn more to botany, especially to the grasses, which had been a life-long interest and on which he became an acknowledged expert. This change in interests evidently led to Ron depositing his Diptera collection at the Bristol Museum & Art Gallery before his move to Norfolk. This collection comprised 50 store boxes, with most families represented, estimated as about 8000 specimens of 1300 species. The Syrphidae have been incorporated in the main collection, but most other families remain in store boxes as presented. While this is a mainly British collection, Ron collected some Diptera on foreign holidays in the period from 1970 to 1975 so there are a small number of specimens (especially of Asilidae and Tabanidae) from Austria, France, Germany, Luxemburg, Spain and Switzerland.

Ron's grass collection began in 1943 when, while working in Leicester, he was encouraged by C.E. Hubbard to collect grasses from the Midlands for Kew. He amassed a large herbarium of grasses from all over the world, including many received from other collectors. This collection, which was donated to Reading University in 2004, comprised 4500 sheets of grasses representing over 1750 species, and according to Jury (2004) he was reputed to have seen all British grasses except *Poa flexuosa*. He speculated on the origin of the name Yorkshire Fog (Payne, 1989), but his botanical publications were mostly of a more general nature, and the flora of walls was a particular interest (Payne, 1978a, 1990b, 1998, 2001c, 2005d, 2010b and in press). He was an active member of the Botanical Society of the British Isles and took part in many of its field meetings, including foreign tours. On these he ensured that the local expert guides did not neglect the grasses in favour of more showy flowering plants and found, for instance, the bizarre "caterpillar grass", *Beckmannia eruciformis*, in Hungary in 1985. Ron also led botanical tour holidays to the Alps and the Mediterranean, including to Morocco with Frank Perring.

Ron retired from the civil service on 4 June 1982. He and Sheila remained at East Harptree until 1991, when they moved to Watlington in Norfolk. While there he made many local botanical contributions and was an active member of the Norfolk and Norwich Naturalists' Society. He contributed to their journal (Payne, 1993, 1995), but following a disagreement with the Editorial Committee over presentation of his papers, he published some of his later botanical work while in Norfolk privately (Payne, 1998, 2000b, 2002c). During that time he also published regularly in the *BSBI News* and in the parish magazine *Watlington Gossip*. His Norfolk botanical survey notebooks were deposited with the Norwich Castle Museum.

Following Sheila's death in 2007 Ron returned to Westcliff-on-Sea, where he spent the remainder of his life. He then rejoined the South Essex Natural History Society

and resumed his study of the wall flora of that district, resulting in his most recent publications (Payne, 2010b and in press). Also during this time he assisted Ken Adams in contributing to a projected update of Jermyn's Flora of Essex.

As Ron's interests changed he donated parts of his collection to museums, usually shortly before moving to a new area. His Odonata (35 specimens) and Orthoptera (258 British and 29 continental specimens) were given to the Southend Museum in the 1970s, his Diptera and one box of Neuroptera to Bristol in 1989 and his Hymenoptera (1803 specimens) and recent Coleoptera (3822 specimens) to the Norwich Castle Museum, when he moved back to Essex in 2007. The present location of his earlier Coleoptera collection, including specimens collected by his father, is uncertain. It is widely believed that it was given to the Natural History Museum in the 1960s, before he moved from Loughton, but there appears to be no record there of its receipt, and enquiries as to the present location of this collection are continuing. Ron also donated to this Society a named collection of crane flies, a group that was previously poorly represented in the Society's collections.

A card index of Ron's Diptera collection was donated to the Essex Field Club in 1985 and is currently held by their Diptera recorder, D. A Smith. The earliest records are dated 1947 and the most recent 1984 and both British and European records are included. The Essex records are being extracted and placed on a Mapmate database, as far as practicable given that grid references were not recorded. The data on this index had been transcribed from notebooks, which had unfortunately been discarded by 1984 according to information that Ron then gave to the Field Club. We have not established if similar indexes exist for other orders.

Apart from the Societies mentioned above, Ron was a Fellow of the Royal Entomological Society and of the Linnean Society. Throughout his life his greatest contribution was to local Societies, with which he became involved wherever he was based and he served these Societies in many ways. He always gave encouragement to beginners and we, like many others, benefited from his support and friendship.

We are grateful to Ron's daughter Maggie Gibson for biographical details and for the photograph of Ron included here, to Ken Adams and Ray Barnett for information on Ron's publications, to Keith Hyatt for details of his involvement with the London Natural History Society, to Del Smith for information on his Diptera card index and to Rhian Rowson, Tony Irwin, Roger Payne and Roger Booth for information on his collections. An appreciation of his contribution as a dipterist, including reminiscences of Ron, has appeared elsewhere (Chandler, 2011).

PETER CHANDLER AND ROGER HAWKINS

Note

Any information on the whereabouts of Coleoptera specimens collected by L. G. Payne in the 1940s, or by R. M. Payne before 1967, would be appreciated.

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- 2004b. Harebells and Tansy. *Watlington Gossip* No. 24.
- 2005a. What is a weed? *Watlington Gossip* No. 25.
- 2005b. *Oxalis dillenii* also in Norfolk. *BSBI News* No. **99**: 50.
- 2005c. Bird-seed Flowers. *Watlington Gossip* No. 26.
- 2005d. The Flora of Walls and Buildings in the Isle of Ely. *Nature in Cambridgeshire* **47**: 43–58.
- 2005e. *Podagrica fuscipes* (Fabricius) (Chrysomelidae) new to Norfolk, and a note on *P. fuscicornis* (Linnaeus). *The Coleopterist* **14**: 49–50.
- 2005f. Railway Plants. *Watlington Gossip* No. 27.
- 2006a. List of Plants on the Glebe Land. *Watlington Gossip* No. 29.
- 2006b. Some Wild Flowers of the River Banks. *Watlington Gossip* No. 30.
- 2006c. Wild Flowers in the Churchyard. *Watlington Gossip* No. 31.
- 2007a. *Aclypea opaca* (Linnaeus) (Silphidae) returns to Norfolk. *The Coleopterist* **16**: 38–39.
- 2007b. Our Vanishing Wild Flowers. *Watlington Gossip* No. 34.
- 2010a. On the Flora of Railway Banks. *BSBI News* **113**: 25.
- 2010b. The Flowering Plants & Ferns of Walls in South Essex Vc.18 2007–2010. *Essex Naturalist (New Series)* **27**: 166–173.
- (in press) The Ferns of Walls in South Essex. *South Essex Naturalist* (2009–2010).

OBITUARY



PIERRE VIETTE
1921–2011

Dr Pierre Viette died on the 30 April 2011 just before his ninetieth birthday. He was a special life member of the British Entomological and Natural History Society having joined in 1951. We thank the French magazine 'Oreina' for permission to reproduce this note and the picture accompanying it.

Dr. Viette was a graduate in natural sciences and spent his entire career at the Entomological Department of the Museum of Paris. He was deputy director for many years and Head of the Lepidoptera department. His work focussed mainly on the primitive (homoneurous) moth fauna around the world, from French Oceania, the Reunion Islands and especially Madagascar, where he discovered a large number of species. His writings, more than four hundred articles and notes, have appeared in many publications including the *Bulletin of the Entomological Society of France* of which he was editor in chief for 33 years, the *French Review of Entomology* and the *Bulletin of the Linnean Society of Lyon*. He was also editor of the *Wildlife of Madagascar* for 37 years (Vols 16–89), a series covering the whole of the island's fauna. His work covered many groups, including within the Lepidoptera, Hepialidae, Pyraloidea and Noctuidae as well as the Rhopalocera and covered most biogeographical regions including France.

A full obituary, written by Professor Joel Minet and Dr. Paul Thiaucourt, will appear in a future edition of the *Bulletin of the Entomological Society of France*.

TONY PICKLES

SOCIETY NEWS

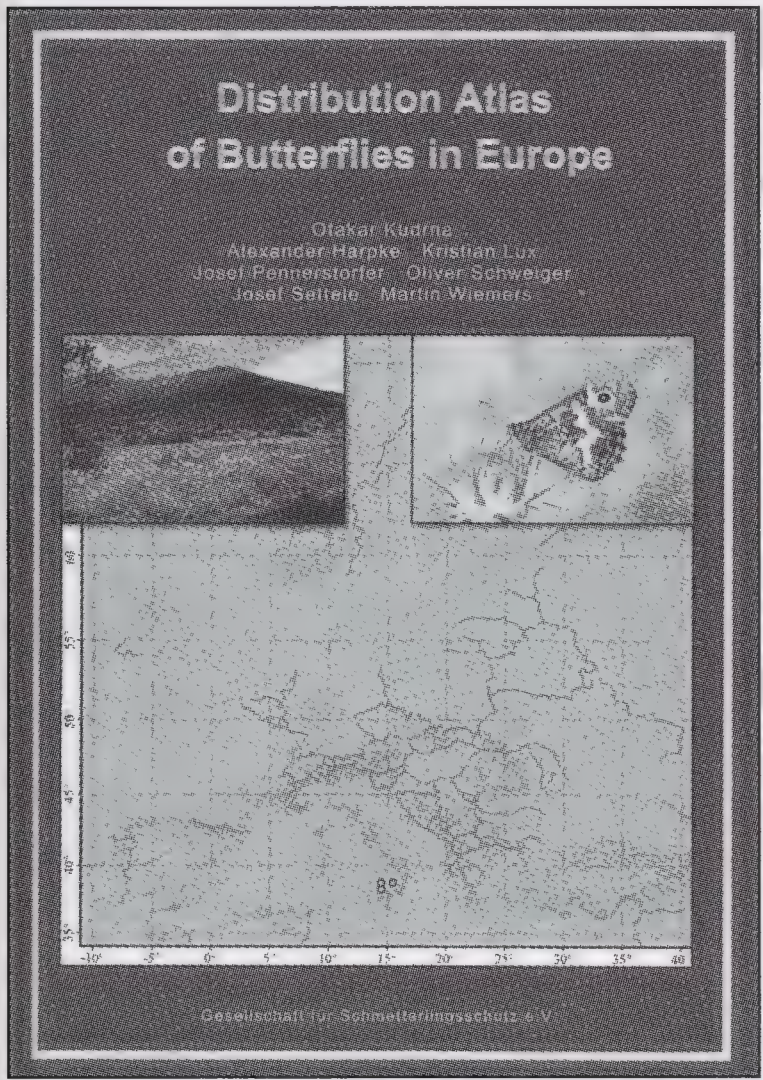
New books in the Society’s library

There has been no recent listing of the new books that have been purchased for the Society’s library, so it was thought that a summary would be useful. This might just result in an upsurge of borrowing. A brief thank you to those members who have kindly donated books to the library is given in the Librarian’s Report each year and members are advised to consult the AGM reports for titles of these books. The books are available for loan by visitng the library at Dinton Pastures. For simplicity the list has been arranged by alphabetical order of the author(s).

Amiet, F.	2008	<i>Vespoidea 1</i>
Amiet, F., Herrmann, M., Muller, A. & Neumeyer, R.	2007	<i>Apidae 5</i>
Anderson, R., McFerran, D. & Cameron, A.	2000	<i>The ground beetles of Northern Ireland</i>
Baldock, D. W.	2008	<i>Bees of Surrey</i>
Barber, A. D.	2009	<i>Centipedes</i>
Barber, A. D.	2008	<i>Key to the identification of British centipedes</i>
Barnet, R. J., Andrews, R. M., Bailey, M. A., <i>et al.</i>	2008	<i>Moths of the Bristol Region</i>
Beccaloni, J.	2009	<i>Arachnids</i>
Bengtsson, B. A. & Palmqvist, R.	2008	<i>Fjarilar Kakmalar – sackspinnare Lepidoptera: Micropterigidae – Psychidae</i>
Biedermann, R. & Niedringhaus, R.	2009	<i>The plant & leaf hoppers of Germany</i>
Blackman, R. L.	2010	<i>Aphids – Aphididae (Macrosiphini)</i>
Blank, S. M., Schmidt, S. & Taeger, A. (eds)	2006	<i>Recent sawfly research</i>
Bouček, Z. & Rasplus, J.-Y.	1991	<i>Illustrated key to west-Palaearctic genera of Pteromalidae</i>
Buse, J., Alexander, K., Ranius, T. & Assmann, T.	2009	<i>Saproxylic beetles – Their role and diversity in European woodland and tree habitats</i>
Cameron, R.	2008	<i>Land snails in the British Isles</i>
Cham, S.	2009	<i>Field guide to the larvae and exuviae of British dragonflies</i>
Cooper, J. & Barclay, M. V. L.	2006	<i>A coleopterist’s handbook</i>
Cox, M. L.	2007	<i>Atlas of the seed and leaf beetles of Britain and Ireland</i>
Denton, J.	2005	<i>The Beetles of Surrey – a checklist</i>
Dijkstra, K.-D. B.	2006	<i>Field guide to the dragonflies of Britain and Europe</i>
Don, W.	2007	<i>Ants of New Zealand</i>
Du Chatenet, G.	2005	<i>Coleopteres D’Europe vol 1 Adephaga , Carabes, Carabiques & Dytiques</i>
Du Chatenet, G.	2000	<i>Coleopteres Phytophages D’Europe</i>
Du Chatenet, G.	2002	<i>Coleopteres Phytophages D’Europe Tome 2 Chrysomelidae</i>
Dunbar, D.	2010	<i>British butterflies, a history in books</i>
Elliott, J. M. & Humpesch, U. H.	2010	<i>Mayfly larvae (Ephemeroptera) of Britain and Ireland</i>
George, R. S.	2008	<i>Atlas of the fleas (Siphonaptera) of Britain & Ireland</i>
Gordh, G. & Headrick, D.	2011	<i>A dictionary of entomology (revised)</i>
Gregory, S.	2009	<i>Woodlice and waterlice (Isopoda: Oniscidae & Asellota) in Britain and Ireland</i>

- Hawkins, R. D. 2003 *Shieldbugs of Surrey*
- Hill, L., Randle, Z., Fox, R. & Parsons, M. 2010 *Provisional atlas of the UK's larger moths*
- Hopkin, S. P. 2007 *Key to the Collembola (springtails) of Britain & Ireland*
- Klausnitzer, B. 2009 *Insecta: Coleoptera Scirtidae*
- Lach, L., Parr., C. L. & Abbott, L. 2010 *Ant ecology*
- Langton, P. K. & Pinder, L. C. V. 2007 *Keys to the adult male Chironomidae of Britain and Ireland 1*
- Langton, P. K. & Pinder, L. C. V. 2007 *Keys to the adult male Chironomidae of Britain and Ireland 2*
- Lastuvka, Z. & Lastuvka, A. 2001 *The Sesiidae of Europe*
- Leaurut, P. 2009 *Moths of Europe vol 2 Geometrid moths*
- Lee, P. 2006 *Atlas of the millipedes (Diplopoda) of Britain and Ireland*
- Leraut, P. 2006 *Moths of Europe, Saturnids, Lasiocampids, Hawkmoths, Tiger moths*
- Levey, B. 2009 *British Scraptiidae*
- Manley, C. 2009 *British moths and butterflies*
- Nichols, S. W. 1989 *The torre-bueno glossary of entomology*
- Oosterbroek, P. 2006 *The European families of the Diptera*
- Pape, T., Bickel, D., Meier, R. 2009 *Diptera Diversity: status, challenges and tools*
- Plant, C. W. 2008 *The moths of Hertfordshire*
- Pontin, J. 2005 *Ants of Surrey*
- Razowski, J. 2002 *Tortricidae of Europe 1*
- Razowski, J. 2003 *Tortricidae of Europe 2*
- Redfern, M. 2011 *Plant Galls*
- Riley, A. M. & Prior, G. 2003 *British and Irish pug moths*
- Robineau, R. (ed) 2007 *Guide des papillons nocturnes de France*
- Robinson, G. S. 2009 *Biology, distribution and diversity of tineid moths*
- Rotheray, G. E. & Gilbert, F. 2011 *The natural history of hoverflies*
- Rozkosny, R., Gregor, F. & Pont, A. C. 1997 *The European Fanniidae (Diptera)*
- Russell-Smith, A. (ed) 2008 *British Arachnological Society – Member's handbook*
- Sevcik, J. 2010 *Czech & Slovak Diptera associated with fungi*
- Skinner, B. 2009 *Colour identification guide to moths of the British Isles*
- Townsend, M. & Waring, P. 2007 *Concise guide to the moths of Great Britain and Ireland*
- Townsend, M. C., Clifton, J. & Goodey, B. 2010 *British and Irish moths: An illustrated guide to selected difficult species*
- van Veen, M. P. 2010 *Hoverflies of northwest Europe*
- Vazquez, X. A. 2022 *European fauna of Oedemeridae*
- Williams, R. 2007 *British Hymenoptera: Glossary for use with identification keys*
- Williams, R. 2009 *British bumblebees*
- Williams, R. 2010 *Oak galls in Britain 1*
- Williams, R. 2010 *Oak galls in Britain 2*

BOOK REVIEWS



Distribution Atlas of Butterflies in Europe by Otakar Kudrna, Alexander Harpke, Kristian Lux, Josef Pennerstorfer, Oliver Schweiger, Josef Settele & Martin Wiemers. (Gesellschaft für Schmetterlingsschutz e.V. Halle, 2011). Hardback, 576 pp, 446 colour maps. 65 Euros. ISBN 978-3-938249-70-3.

Anyone with a deep interest in European butterflies needs access to an authoritative and up-to-date reference work covering distribution, taxonomy and conservation. Until now, those features have not been available within a single volume, and lepidopterists have had to make do with popular field guides with thumbnail distribution maps, outdated nomenclature and imprecise comments on rarity and conservation. The publication of the *Distribution Atlas of Butterflies in Europe* lays a fresh milestone, setting a common baseline for the future.

Field guides have their place of course; in a compact book they include photographs for identification and provide vernacular names. The *Distribution Atlas* does not. Its 576 pages weigh in at 1.5 kg, it features colour maps, but few photographs of butterflies, and it uses scientific nomenclature throughout. This is a volume for serious lepidopterists, for students or amateurs seeking to upgrade their knowledge, but it is not a book for everyone's rucksack. It is a multinational product, on a pan-European topic, written entirely in English.

The core of the atlas comprises mapping for all 441 species of butterfly found in Europe. Each map is about 20 times the size of the usual thumb-nail, and takes up most of the B5 page. Red blobs show pre-1950 records, yellow 1951–1980, and green 1981 onwards. The background map shades mountains and indicates Lat & Long clearly. A box is provided to cover the Macaronesian Islands (i.e the Canaries, Madeira and the Azores etc.) Each blob marks a 'Basic Recording Field' of half a degree of longitude by half a degree of latitude – approx 50 km square. This provides much better definition than has been published elsewhere, and is based on the most thoroughly evaluated data. Below each map are compact notes on the Zoogeography, Conservation and (where relevant) Taxonomy of each species. At first glance, this appears to be in code, but an enormous amount of information has been presented and the conservation status codes are explained in the section ahead of the maps.

Specialists may wonder why only 441 species are covered, when the European Red List published in Van Swaay *et al.* (2010) includes many more. Because the Atlas defines Europe precisely it excludes elements of Russia, Kazakhstan and Asia Minor which are covered in the Red List. Another distinction lies in the precise allocation to species; some of the 'species' in the Red List are treated as subspecies here. In such cases, the text justifies the authors' decisions – generally within Chapter 3: 'Checklists of Species', but sometimes on the individual maps, where several subspecies have been lumped together. Chapter 3 is extremely informative, describing the

development of classification over the years, the use of DNA techniques for discrimination and the importance of abiding by the International Code of Zoological Nomenclature. The resulting taxonomy re-allocates a number of species to genera other than those in longstanding use. A list of synonymy is provided by way of explanation. The resulting checklist is presented in Chapter 3 first systematically, then alphabetically and it is the alphabetic sequence that is used for the map pages. A separate index at the back of the book covers the species names only, which makes it easy to find the right page from a known specific name. It does not help directly in searching for taxa redefined as subspecies, perhaps such as *Iphiclides feisthamelii* (Duponchel), which is treated as a full species in the Red List. In such a case, a short search of Chapter 3 will often lead the reader to a conclusion.

Twenty pages of analysis and evaluation follow the species maps, with more maps showing coverage and density of recording, along with a country by country account of the very variable quality of records. Other maps useful for conservation purposes show species diversity for endemics, Red listed and protected species. Alternative ways of judging rarity or conservation value are offered, and each species is given a Distribution Index (DI), which is its range as a percentage of the area of Europe. *Maniola jurtina* (L.), for example, is found in 68% of Europe, whilst *M. halicarnassus* Thomson weighs in with a mere 0.05%.

The Atlas is the product of the Mapping European Butterflies (MEB) project, and the unique methods of the scheme are explained in the 47 pages before the maps. The final chapter, "Outlook", encourages participation in the next phase, MEB-3, and provides a standard recording sheet, which is a miniaturised tick list of the species arranged systematically. This is available as a download from the MEB website: <http://www.european-butterflies.ufz.de/index.php?de=17419> and is likely to be very useful to anyone with an interest in European butterflies. Those who have participated in the Mapping European Butterflies project before will understand the reason for including a Gazetteer of 7300 reference localities (RLs) arranged alphabetically under countries. Each basic recording field contains a number of RLs (places listed in the Times Atlas of the World) and recorders simply choose the closest for easy entry to the MEB database.

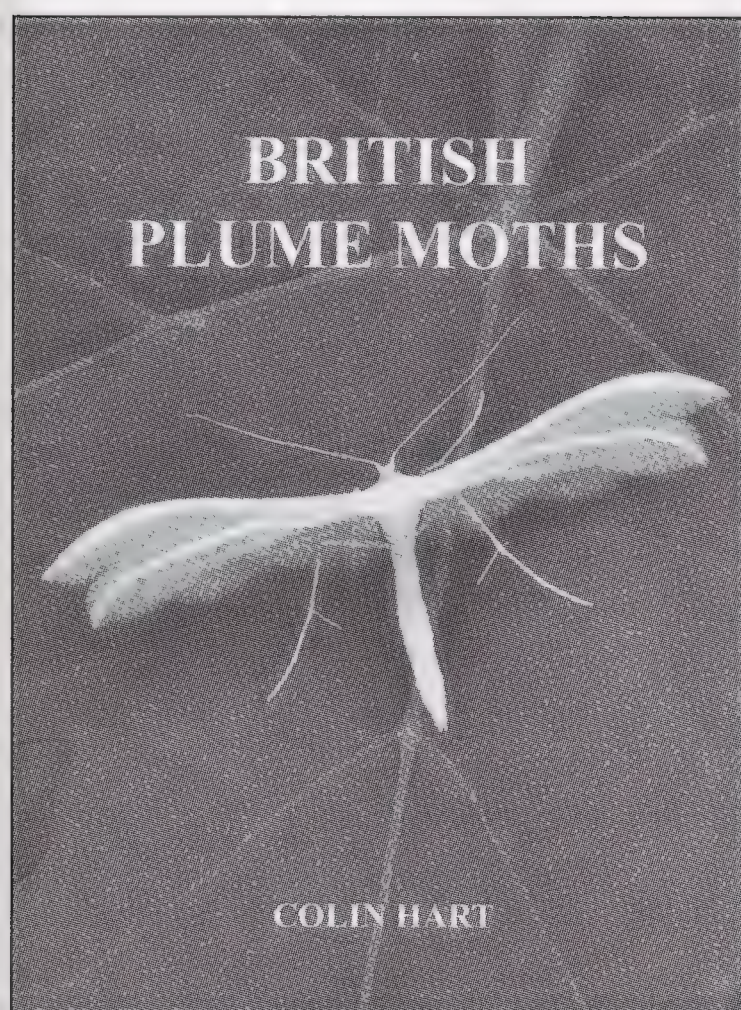
An unfortunate slip in data conversion has somehow spoilt the maps for Cyprus; some blobs have appeared in red, leaving an impression of extinction for species that are still very much present. Fortunately, this error does appear to be confined to Cyprus.

In summary then, the Distribution Atlas provides a great deal more than its superb distribution maps. For the specialist, it provides a wonderful source of reference on taxonomy, zoogeography and conservation value. For the amateur, it offers an authoritative nomenclature and opens a route to deeper study. Whether the nomenclature it provides will gain general acceptance is not yet clear. To quote from page 25: "Therefore a stable taxonomy of European butterflies is not in sight and a careful comparison of molecular and non-molecular data will remain indispensable for many years to come."

ROB PARKER

REFERENCE

- Van Swaay, C., Cuttelod, A., Collins, S., Maes, D., Lopex Munguira, M., Šašić, M., Settele, J., Verovnik, R., Verstrael, T., Warren, M., Wiemers, M. & Wynhof, I. 2010. *European Red List of Butterflies*. Luxembourg: Publications Office of the European Union.



British Plume Moths, a Guide to their Identification and Biology by Colin Hart. Published by The British Entomological and Natural History Society, November 2011. Hardback, 278 pp. (including 46 colour plates and 27 of genitalia drawings). £24.00 (£16.00 for members). ISBN: 978-1-899935-06-2.

This book takes our knowledge of British plumes to a significantly higher level than did the previously indispensable guide to them published about sixty years earlier by Bryan Beirne, particularly with regard to their biology. It also provides what promises to be a virtually foolproof, copiously illustrated approach to their identification so that a novice should make swift progress with gaining experience of the group. Biology and ease of identification are stated to be the main foci of the book in its short

introduction; this also indicated that many species are more easily recorded with a knowledge of their larvae and host plants. The importance of retaining voucher material to confirm records and identifications is emphasised: if in doubt, collect and dissect.

The second and third chapters cover collecting, rearing, recording and identification, and provide general accounts of structure and behaviour of all stages, including some discussion of migration. In a paragraph on taxonomy, the reader is warned that the genus *Stenoptilia* is still in a state of flux, and that study of the genitalia and larvae is important. A glossary and a guide to adult external morphology are followed by Chapter 4, a checklist of the British fauna. The species-group names agree in gender with the genus, a departure from the decision by a consensus of European lepidopterists (including this reviewer) to retain original orthography (Sommerer, 2002: *Nota lepid.* 235: 191–204).

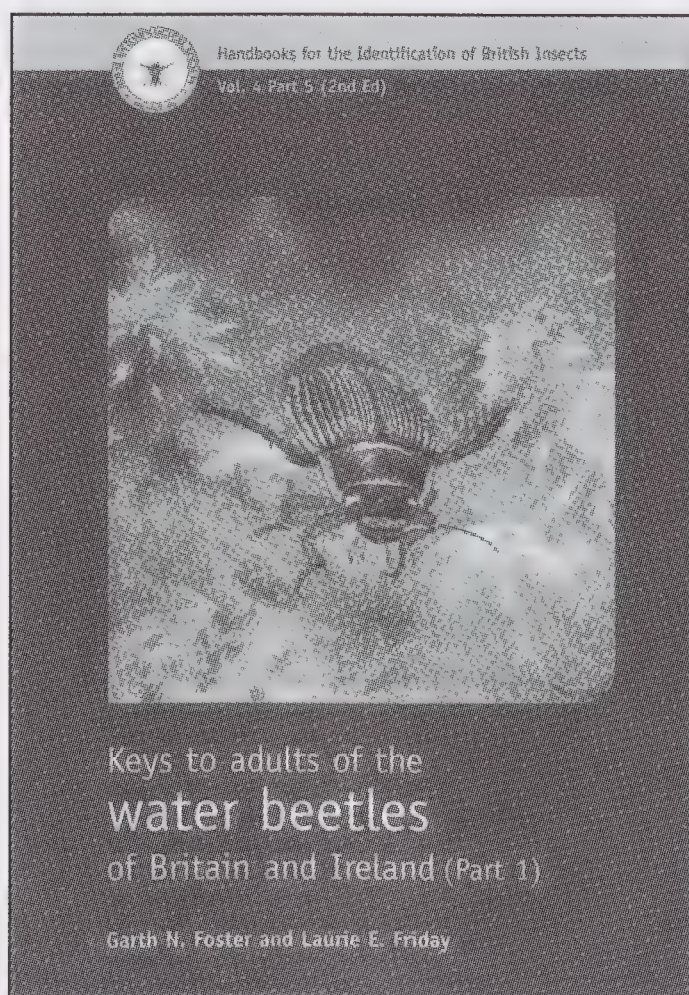
The fifth chapter presents the keys, commencing with a thoughtful introduction on how to use them that is loaded with caveats! The first key is to genera and is followed by keys to species in genera where there is more than one species. Within the keys, couplets are illustrated with clear line drawings of the character-states.

The final chapter continues very detailed descriptions of each species, including its early stages, life history, host-plants, times of adult appearance and distribution within the British Isles. For rarer species and migrants, more extensive data are provided of historical records with localities. Records of parasitoids for each species are also given.

The Plates illustrate the male and female genitalia of all species in immaculate detail as one would expect from Mike Roberts, and they were prepared for printing by Katherine Child. Thomas Creedy prepared the colour plate of set specimens, each image being presented both life-size and much enlarged with high quality reproduction. The final 20 colour plates each contain between five and seven images of adult moths at rest, larvae, pupae and some eggs. In a couple of images the author managed to persuade adults of two very similar species to sit beside each other. The book is completed by references, an index, and a list collating host-records according to plant species.

My only criticism of this splendid book (and that of Beirne earlier) is that it does nothing to place the British fauna in a wider context. As someone whose interest in biogeography may well have grown from seeds sown in boyhood from the volumes of South where species were said to extend 'east to Amurland', the perhaps apocryphal headline 'Dense Fog in Channel, Continent Cut Off!' kept creeping into my mind. Distributions beyond the British Isles are only given for some rare migrant species or recent arrivals. These islands support an interesting but very attenuated post-glacial fauna. It would not have been difficult to convey this context by extracting brief details from the works by Cees Gielis and Ernst Arenberger mentioned in the Preface of global generic richness, range and centres of species richness within genera and also providing some idea of the wider range of each British species. Climate change and its effects may serve to change this tendency to be a bit parochial, and in future less excitement (and perhaps more worry) will be engendered by the occasional appearance in these islands of what are notorious African and Mediterranean crop pests.

JEREMY HOLLOWAY



Keys to adults of the water beetles of Britain and Ireland (Part 1) Coleoptera: Hydradeephaga: Gyrinidae, Haliplidae, Paelobiidae, Noteridae and Dytiscidae by Garth Foster and Laurie E. Friday. 144 pp. Handbooks for the Identification of British Insects, Volume 4 Part 5 (second edition). Published for the Royal Entomological Society by the Field Studies Council, 2011. Softback £24.00. ISBN: 978-0-901546-93-7.

This work completely replaces that of Balfour-Browne (1953) but only covers some of those families (i.e. Gyrinidae, Haliplidae, Paelobiidae, Noteridae and Dytiscidae) covered by Friday (1988). There are 144 pages of which pages 123–143 consist of some wonderful colour plates of photographs that illustrate every species of these families found within the British Isles and Ireland.

There is a List of contents, a Dedication, an Abstract and Acknowledgements, and the work

then starts off with an Introduction and short chapters on Morphology, Size and Collecting Methods. There then follows a Checklist in which *Peltodytes caesus* is once again relegated to the end of the Haliplidae; *Stictotarsus multilineatus* has been given its own genus and now becomes *Boreonectes multilineatus*; and *Hyphydrus aubei*, although only found in the Channel Isles is added. This latter is a welcome move and throughout the Channel Isles are included as part of the British Isles.

The index to Keys to Families is headed by a sentence which notes that the key to families covered by this volume and to other families of aquatic beetle is to be found in Appendix 1 on page 113. It is felt that perhaps it would have been more appropriate to have included this key here rather than at the end.

First are the Gyrinidae with an introduction to the family, line illustrations of upper and undersides of a *Gyrinus* with the various parts named, and then a key to

genera and to species of *Gyrinus*. The keys work clearly and with line illustrations alongside each couplet to show both male and female genitalia and any other important detail. Each species is then dealt with in detail with notes on habitat, distribution and other useful tips.

The same format is followed with the Haliplidae. The keys work well with a few unfamiliar characters used at times, but these caused no problems to your reviewer. The genitalia were illustrated for all the *Haliphus* except *lineatocollis* (which is easy to identify, even in the field, by upper side characters) and the *fulvus* group (*flavicollis*, *fulvus*, *laminatus*, *mucronatus* and *variegatus*) for which underside characters are used in the key. There was room in the side margins for illustrations of these genitalia and it is felt that their omission was an opportunity missed.

The families Noteridae, Paelobiidae and Dytiscidae are then dealt with in similar fashion. The authors have introduced a number of novel characters in the key to Dytiscidae which provided no difficulties and clarified characters that are a bit obscure in existing keys. Again, line illustrations alongside the key made them easy to follow and genitalia were illustrated in all species where they were needed to identify or confirm identification.

The volume concludes with a distribution chart showing which species are known from Scotland, England, Wales, Isle of Man, Northern Ireland, Republic of Ireland and the Channel Isles and with an indication for records from 1980 onwards, before 1980, and fossil records. There is a very useful list of References carefully selected from the growing literature on water beetles, and a clear index.

Overall this is an excellent work and is full of useful tips on identification and field craft. The proof reading must have been very thorough as your reviewer failed to pick up any typos or other errors. The tabular guides as used in Friday (1988) will be missed and perhaps could have been included but would have taken up a further three pages. This volume is to be very much recommended to all coleopterists whether they take water beetles seriously or not, and to all limnologists and others who carry out pond surveys or other similar activities. Water Beetles Part 2 covering the Polyphaga is promised for the future and it is to be hoped that the few dry land species in that suborder will be treated as honorary water beetles for completeness.

REFERENCES

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Friday, L. E. 1988. A key to the adults of British water beetles. *Field Studies* 7: 1–151. Published separately as *AIDGAPBook* 189, Field Studies Council, Taunton.

ERIC PHILP

SHORT COMMUNICATION

***Micronecta griseola* Horváth (Hemiptera: Corixidae) in North Hampshire and Surrey.** – Adults and nymphs were extremely abundant in the unvegetated margins of the Basingstoke Canal from Rushmoor Flash, North Hampshire (SU855522) to the Surrey border in Ash (SU881518) on 20 May 2011. The bug was also present in Mychett Lake, Surrey (SU893542) on 11 July 2011. These appear to be the first records for VC12 and VC17. It would appear that *M. griseola* is a recent arrival as the only *Micronecta* found in previous extensive sampling in 2001 was *M. minutissima* (L.) which was abundant in the Canal at Eelmoor Flash (SU8452) on 5 June 2001. – JONTY DENTON, 31 Thorn Lane, Four Marks, Hants, GU34 5BX.

FIELD MEETING REPORTS

Sluggan, Carrbridge, Highland, 2 April 2011

Leader: **Mike Taylor**. – The moth trapping event was put on to look for Rannoch sprawler *Brachionycha nubeculosa* (Esper), a species currently only found in the central Highlands, in a new 10km square (NH82).

The populations within Strathspey appear to be doing reasonably well so there was a good chance that we might be successful with finding the species on a new site. The moth favours open mature birch woodland such as that found close to Sluggan bridge two miles west of Carrbridge. It was within this wood that we set up three mercury vapour and three actinic light traps over an area of approximately one square kilometre.

No sooner had the traps been set when it started to rain, fortunately not too heavily and it only lasted for one hour after that it was dry but cool falling to +2°C just after midnight.

However the six of us that turned up were not put off and whilst waiting to see if any Rannoch sprawlers would arrive we watched a number of the more common spring moths fly into the traps.

The Rannoch sprawler is a late evening moth and is rarely seen before 22.00h and more usually after midnight so it was a fairly long wait. But success arrived at 23.35h as one was seen crawling onto the sheet located under a Skinner Trap, within minutes two more arrived, again on foot.

By the time we had packed up and finished we had a total of seven Rannoch sprawlers from four of the traps showing that the moth is well distributed throughout the site, a very satisfactory outcome. A total of fifteen moth species was recorded, most notable were red sword-grass *Xylena vetusta* (Hübner), yellow-horned *Achlya flavicornis* (L.), brindled beauty *Lycia hirtaria* (Clerck), pine beauty *Panolis flammea* (D. & S.), early tooth-striped *Trichopteryx carpinata* (Bork.), *Semioscopis avellanella* (Hübner), and the tortricids *Acleris notana* (Donovan) and *A. hyemana* (Haworth). Common quaker *Orthosia cerasi* (Fabr.) (66 individuals) was more abundant than Hebrew character *O. gothica* (L.) (34 individuals).

For permission to trap moths on this site and permit vehicular access to transport generators and traps thanks go to Strathspey Estate.

Duns Castle SWT Reserve, Berwickshire, Scottish Borders, 21 May 2011

Leader: **Barry Prater**. – This was an event organised jointly by Butterfly Conservation East Scotland and the Berwickshire group of the Scottish Wildlife Trust and was held in an area of mixed, but mainly broad-leaved woodland in the extensive grounds of Duns Castle. It had been arranged as part of Scottish Borders Biodiversity Week and, as such, was intended to be a public event to introduce people who already had a general interest in wildlife to moths and moth recording. Despite being an SWT reserve, the site has very few moth records and so it was also hoped that the evening would provide some new data.

Three light traps (2 × 125W mv + 1 × 15W actinic) were set up at different locations by Ron McBeath and Barry Prater before people arrived around 21.30h; to make the evening more enjoyable barbecued sausages and salmon steaks were also provided. This turned out to be a good ploy because despite the cool, breezy and increasingly damp evening, nearly 20 people came along and stayed the course until the rain got the better of us and we packed up around midnight.

A total of 20 different species was recorded and of these, eleven were new records for the NT75 hectad (or at least they had not been seen there in the previous half century). Amongst the highlights were a clouded silver *Lomographa temerata*

(D. & S.), only the seventh record ever for VC81, and an iron prominent *Notodonta dromedarius* (L.), the second record for VC81 since 2000. As well as these, other moths which delighted the attendees were early thorn *Selenia dentaria* (Fabr.) (2 individuals), pale prominent *Pterostoma palpina* (Clerck) (4 individuals), nut-tree tussock *Colocasia coryli* (L.) (5 individuals), brimstone moth *Opisthograptis luteolata* (L.) (9 individuals) and the most abundant species, the scalloped hazel *Odontopera bidentata* (Clerck) (15 individuals).

Although there were no exceptional findings, the evening was very much a success in terms of the numbers attending and their enthusiasm; at least one couple have subsequently become keen and effective moth recorders in the area. The fact that such a limited exercise can put several new 'dots on the map' illustrates how much there is still to discover in this relatively thinly populated and under-recorded part of the country. Thanks go to Ron McBeath for providing one of the traps, to Ron and his wife Susan for operating the barbecue, to Murray Henderson the local SWT volunteer who looks after the reserve for making the arrangements and to Roy Leverton for confirming some of the identifications after the event.

Plora Wood, Innerleithen, Peeblesshire, 21 May 2011

Leaders: **Reuben Singleton (RS) and John Woolliams.** – This moth trapping event in Plora Wood Site of Special Scientific Interest (SSSI) situated between Walkerburn and Innerleithen approximately ten miles east of Peebles, coincided with the end of the hot sunny spring and it rained heavily all evening with strong blustery winds. Plora Wood is the largest area of ancient semi-natural woodland in Peeblesshire and has previously yielded a number of notable species including scarce prominent *Odontosia carmelita* (Esper) and oak nycteoline *Nycteola revayana* (Scopoli). One Robinson mv 125W trap was operated with two 8W Heath traps deployed elsewhere in the woodland. In addition 'sugaring' was undertaken on a number of trees throughout the woodland before darkness fell.

Two hardy members of the public attended the event and were shown a selection of moths caught in RS's garden on the previous evening, as well as being introduced to moth survey techniques. Due to the dreadful weather, the guests elected to leave after an hour and they were closely followed by two very bedraggled leaders! Only two moths were recorded in the traps, both scalloped hazel *Odontopera bidentata* (Clerck) in the Robinson trap. Two further species (single individuals) were netted in car headlights as we beat our retreat from the woodland; early thorn *Selenia dentaria* (Fabr.) and water carpet *Lampropteryx suffumata* (D. & S.), along with a further scalloped hazel. The sugaring solution was invisible by the time of departure having been completely washed from the treated trees.

For permission to trap moths on this site and permit vehicular access to transport generators and traps thanks go to Forestry Commission Scotland.

Quants, Ringdown, Ruggin and Yarty, Blackdown Hills, Somerset, 11 June 2011

Leader: **Martin Drake.** – Spreading the word locally made this meeting work, as three of the five entomologists who arrived were from the Somerset Invertebrate Group. Clearly the quirky site names were insufficient draw. The Blackdowns fall at the west end of the narrow diagonal slash of Upper Greensand that ends at The Wash. The formation has interspersed layers of sand and clay, giving rise to acid habitats that can be very soggy where water seeps out where the sand overlies the clay. Numerous remnants of wet heaths, wet woods and bogs are dotted across the Blackdowns and our meeting visited a cluster of four of these, all Somerset Wildlife Trust reserves. Quants and Ruggin are contiguous and include dry and wet woodland

on a cold north-facing slope. Ringdown Common has a mixture of acid pasture with seepages and wet woodland, and Yarty is a small acid mire. They are all on valley sides, so the terrain was steep on even the boggiest of sites. Our visit coincided with the sort of June day when most of us would not have bothered stepping outside. It was cool although sunny to start with but got progressively colder, so that only two of us were left by the time we got around to Yarty in a cold wind under grey cloud.

Collectively our specialisms covered a broad spectrum of invertebrate groups. We recorded about 320 species including 200 flies and the rest in 11 other orders. Many of these were from Ringdown Common, which was the most diverse and appealing of the sites.

Acid mire is one the most interesting aspect of the Blackdown Hills. The specialists of mires included the largest concentration of local species, and they were certainly more interesting than the species associated with more run-of-the-mill grasslands. There were plenty of the dolichopodid flies *Rhaphium longicorne* (Fallén) and *Dolichopus atratus* Meigen, and many of the little crane fly *Molophilus occultus* de Meijere and larger *Phylidorea squalens* (Zetterstedt) at Ringdown and Yarty. Other bog or wet heath species were the lace-hopper *Cixius similis* Kirschbaum at Yarty and the little marsh beetle *Cyphon hilaris* Nyholm at Ringdown. On the vegetation of drier ground at Ringdown, Tony Smith recorded the mirid bug *Heterocordylus genistae* Scopoli which is associated with gorse, broom and dyer's greenweed. A local leaf-hopper, *Sonronius dahlbomi* (Zetterstedt), which is usually associated with base-rich fen, was also found here, so the site probably offers a wider range of base conditions than suggested by the dominant vegetation.

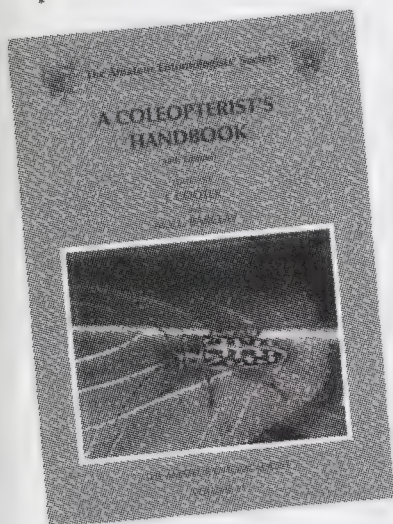
The nationally uncommon species were all flies which with one exception were found only at one of the sites. The local BAP crane fly *Lipsothrix nervosa* Edwards, a supposed endemic to Britain, is frequently encountered in wet woods in the south-west of England, so its presence at the streams at Ruggin was not an exceptional find. Nearby at Quants were two uncommon woodland hoverflies, the spectacular *Volucella inflata* (Fabr.) spotted by Robin Edwards and comparatively insignificant *Sphegina verucunda* Collin. As may be expected in so much wet woodland, crane flies were well represented overall, and included *Tasiocera robusta* (Bangerter), which is perhaps not really scarce but just off-puttingly minute, the pretty *Limonia lucida* (Staeger), *Thaumastoptera calceata* Mik and *Pilaria fuscipennis* (Meigen) at Ruggin, and the last also at Ringdown. Open mire was disappointing for uncommon species, and the only noteworthy find was the dolichopodid *Tachytrechus consobrinus* (Haliday). The rarest record, from Yarty, was the daddy-longlegs *Tipula marginella* Theowald, which is more usually associated with fens and marshes than with acid mires. The uncommon lesser dung-fly *Themira gracilis* (Zetterstedt) was also found at Yarty where the SWT's ponies probably provide the right trampled mix of dung and peat in which the larvae develop.

Not many bees were flying, unsurprisingly given the cold weather, but Robin Edwards obtained the remarkable record for seeing five of the six British cuckoo bumblebees on scruffy thistles at Ringdown. The recently colonising *B. hypnorum* (L.) was present at Quants, although it was widespread further west in east Devon in the previous summer. The least common of the bees was *B. ruderarius* (Müller) at Ringdown. Our local gall-hunter, Una Garland, recorded over 20 species that almost certainly would not have been recognised if we had collected the adults – mites, gall midges and a few anthomyiid flies. Toddy Cooper was rather disappointed in the small range of spiders he found, most of which were common species, and this has been a common theme among many other groups in the first part of 2011. We all blame the weather.



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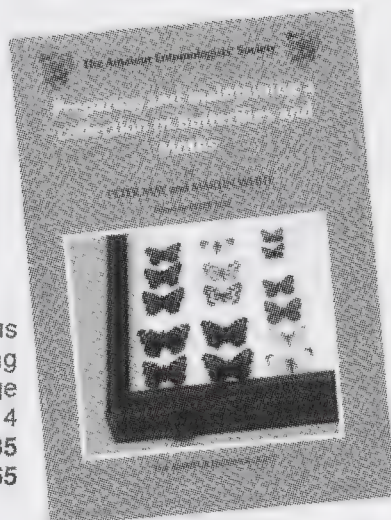
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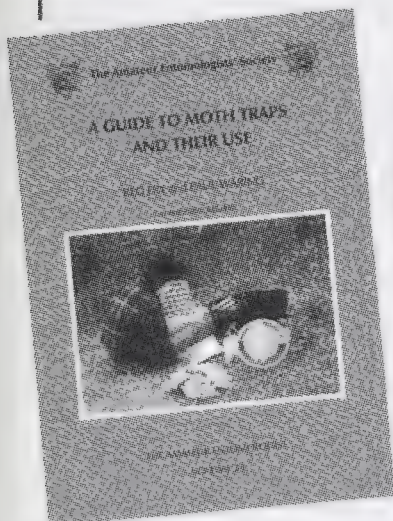
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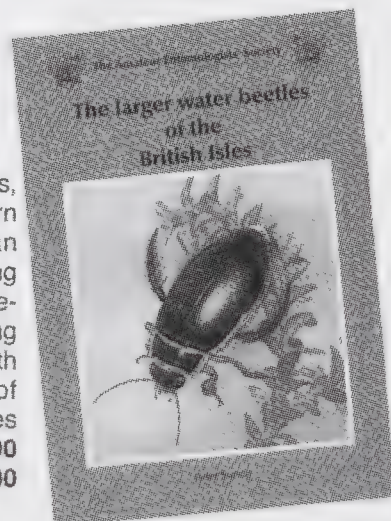
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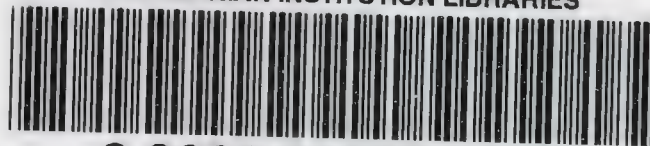


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Cover photograph: *Prochoreutis myllerana*, Wareham, Dorset, 28.vii.2008. Photo: C. Manley.

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FIRST INCURSION OF CHINESE MUSSEL SCALE *LEPIDOSAPHES CHINENSIS* (HEMIPTERA: DIASPIDIDAE) IN EUROPE, WITH A REVIEW OF *LEPIDOSAPHES* SPECIES FOUND IN BRITAIN

C. MALUMPHY¹, A. J. HALSTEAD² & A. SALISBURY²

¹The Food and Environment Research Agency, Sand Hutton, York YO41 1LZ

²The Royal Horticultural Society's Garden, Wisley, Woking, Surrey GU23 6QB

ABSTRACT

In November 2011, a large infestation of *Lepidosaphes chinensis* Chamberlin (Hemiptera: Diaspididae) was found on a *Yucca elephantipes* plant grown in a conservatory near Northwich, Cheshire, England. Small numbers of scales were also present on *Beaucarnea recurvata*, *Euphorbia elegans* and *Sansevieria trifasciata* 'Laurentii'. This is the first incursion of this scale insect in Europe. It has previously been intercepted in the Netherlands on *Dracaena sanderiana* imported from China (2005–2006) and origin unknown (2008). The biology, geographical distribution and economic importance of *L. chinensis* are discussed. In addition, the status of the fourteen *Lepidosaphes* species that have been recorded in Britain is reviewed. One species, *L. ulmi* (L.), is native; two non-native species (*L. chinensis* and *L. pinnaeformis* (Bouché)) are currently found breeding on indoor plantings in Britain; the other eleven non-native species are not currently known to be established in Britain. The following *Lepidosaphes* species are recorded here from these countries for the first time: *L. beckii* (Newman) from Bangladesh; *L. gloverii* (Packard) from Bangladesh, Kenya and Uruguay; *L. pinnaeformis* (Bouché) from Madagascar; *L. rubrovittata* Cockerell from Jamaica; and *L. tapleyi* Williams from Ghana and Pakistan.

INTRODUCTION

A single giant yucca *Yucca elephantipes* Regel ex Trel. (Asparagaceae) plant grown in a conservatory heated all year round to 30°C in a private property, near Northwich, Cheshire, England, was found to be infested with scale insects in November 2011. A sample was submitted to The Royal Horticultural Society (RHS) and forwarded to The Food and Environment Research Agency (Fera), where the scales were identified as *Lepidosaphes chinensis* Chamberlin (Hemiptera: Diaspididae), commonly known as the 'Chinese lepidosaphes scale' in the USA (McKenzie, 1956; Gill, 1997). The common name 'Chinese mussel scale' is proposed here for use in Britain, as the female scale cover resembles a mussel, 'mussel scale' is already widely used for the native *Lepidosaphes ulmi* (L.), and the name lepidosaphes is not familiar to non-specialists. The sample leaves were infested with more than 100, mostly live, scales. All developmental stages were present with the exception of adult males, although mature male pupae were present and adult males were likely to have emerged in the near future. The scales had not caused significant damage but had caused small chlorotic spots and black streaks on the foliage. Further enquiries found that small numbers of Chinese mussel scale were also present at the same location on pony tail palm *Beaucarnea recurvata* Lem. (Asparagaceae), mother-in-law's tongue *Sansevieria trifasciata* Prain. 'Laurentii' (Asparagaceae), and *Euphorbia elegans* Spreng. (Euphorbiaceae). All of the infested plants had originally been imported from the Netherlands two or three years before, but this is not confirmed as the origin of the scale infestation, due to the lapse in time.

Lepidosaphes chinensis has been intercepted in the Netherlands, Aalsmeer, on lucky bamboo *Dracaena sanderiana* Sander ex Mast. (Asparagaceae) imported from China, 20.iv.2005, Mijdrecht, 27.xii.2006 and De Kwakel, origin unspecified, 3.i.2008. *Lepidosaphes* ?*chinensis* (specimens were in poor condition) was also intercepted in the Netherlands, Aalsmeer, on lucky bamboo imported from China, 7.viii.2007, but there is no evidence that it has established (Maurice Jansen, pers comm., 2012). The purpose of this communication is to report the first known incursion (an isolated population of a pest recently detected in an area, not known to be established, but expected to survive for the immediate future (FAO, 2009)) of *L. chinensis* in Britain (and Europe) and to review its geographical distribution, biology and economic importance. In addition, the status of the 14 *Lepidosaphes* species recorded in Britain is reviewed.

Slide mounted specimens of *L. chinensis* are deposited at Fera.

DETECTION AND IDENTIFICATION

The following description of *L. chinensis* is based on observations of the British samples. All developmental stages occur on the stems and foliage (upper and lower surfaces) of the host plant (Plate 5, Figs 1–6). The scales often congregate in groups along the leaf margin and at stem nodes (Plate 5, Fig. 1). The adult female scale covers (Plate 5, Figs 2 & 3) are up to 3.0 mm in length, moderately broad, slightly convex, and pale to orange brown with a dark orange terminal exuviae. Adult female bodies are white with the margin of the pygidium yellow to orange. Male scale covers are much smaller and narrower than the female covers, up to 1.5 mm in length, elongate oval, slightly convex, and pale brown with a dark orange terminal exuviae. Male prepupae and pupae are pale lilac, with their eyes deep purple. First instars (crawlers) of both sexes are white and their covers are also white (Plate 5, Fig. 5). Second instar scale covers are brown with a dark orange terminal exuviae (Plate 5, Fig. 6).

Lepidosaphes chinensis was originally described by Chamberlin (1925) from specimens collected from *Magnolia* sp., in Canton, Guangdong, China, in 1925 by the Italian entomologist F. Silvestri. A detailed morphological description and illustration of an adult female is given by Ferris (1938). Keys to the identification of adult female *Lepidosaphes* (including *L. chinensis*) are provided by Ferris (1938) and Gill (1997).

There are currently 163 species assigned to the genus *Lepidosaphes* (Miller, Denno & Gimpel, 2011) and there are no comprehensive keys to all species. Borchsenius (1962, 1963) divided *Lepidosaphes* into ten smaller genera, but this classification is not recognised by most recent workers (Watson, 2002; Miller, Denno & Gimpel, 2011).

Slide-mounted adult female *L. chinensis* (Fig. 1) may be most easily confused in Britain with *L. ulmi* (L.) and in continental Europe with *L. beckii* (Newman). They may be distinguished from *L. ulmi* by the presence of the following combination of characters: prepygidial abdominal segments I–V with small, but distinct, bosses (sclerotised spots) on dorsum (Fig. 1), slightly in from lateral margin on each side; well-developed blunt marginal spurs (Fig. 1); mesal margin of the median pygidial lobes usually notched twice (the latter character is less reliable than the previous two). In *L. beckii* the bosses on the prepygidial abdominal segments are usually absent or, if present, they are indistinct and only three are present on each side. In addition the marginal spurs are small and distinctly pointed (spine-like), and the mesal margin of median pygidial lobes are notched once. *Lepidosaphes chinensis* may



Fig. 1. *Lepidosaphes chinensis* slide mounted female; arrows on the lower left indicate the abdominal bosses; arrows on the lower right indicate the well-developed blunt marginal spurs
© Fera

be distinguished from *L. beckii* by the presence of marginal spurs, and by the presence of bosses on segments I–V, while in *L. beckii* these bosses are present only on segments I, II and IV.

HOST RANGE AND BIOLOGY

Lepidosaphes chinensis is polyphagous, feeding on the following plant families and species: Asparagaceae, *Beaucarnea recurvata* (recorded here), *Dracaena* sp., (recorded here), *Liriope* sp., *Sansevieria trifasciata* ‘Laurentii’ (recorded here), *Yucca elephantipes* (recorded here); Elaeagnaceae, *Elaeagnus umbellata* Thunb.; Euphorbiaceae, *Euphorbia elegans* (recorded here); Lamiaceae, *Caryopteris incana* (Thunb. ex Houtt.) Miq.; Magnoliaceae, *Magnolia* sp.; Orchidaceae, *Cymbidium aloifolium* (L.) Sw., *C. sinense* (Jacks.) Willd., *Cymbidium* sp., *Schomburgkia* sp.; Pandanaceae, *Pandanus* sp.; Papilionaceae, *Indigofera tinctoria* L. (Chamberlin,

1925; Takahashi, 1936; Ferris, 1938; Hunt, 1939; Nakahara, 1982; Tang, 1986; Tao, 1999; Martin & Lau, 2011).

The biology of the scale does not appear to have been studied in detail. The following observations are based on the sample of *L. chinensis* from England. It is sexually reproductive and each female lays between 32 and 38 eggs. All life stages (except adult males, although male pupae were present) were observed in November which suggests that it may have overlapping generations and be multivoltine if environmental conditions are favourable. There were approximately two male scale covers for every female scale, although the sex ratio varied considerably on different leaves.

GEOGRAPHICAL DISTRIBUTION

Lepidosaphes chinensis is native to East Asia and occurs widely in China (Chamberlin, 1925; Takahashi, 1936; Tang, 1986; Tao, 1999), including Hong Kong (Martin & Lau, 2011). It is also recorded from the Philippines (Hunt, 1939), Singapore (Nakahara, 1982), and Taiwan (Takahashi, 1936). Transient populations have occurred in California (USA) on orchids (Ferris, 1938) but it has been eradicated (Gill, 1997). It has been intercepted in the Netherlands on *Dracaena* plants imported from China (Maurice Jansen, pers comm., 2012), but is not known to have established. The first incursion of *L. chinensis* on plants growing indoors in Europe is recorded here.

ECONOMIC IMPORTANCE

There are no published records of *L. chinensis* causing economic damage; however, large populations may cause reduced host vigour and lower the value of ornamental plants. It was observed to cause minor chlorosis and necrotic streaks on the foliage of the giant yucca in Britain.

LEPIDOSAPHES RECORDED IN BRITAIN

Fourteen species of *Lepidosaphes* have been recorded in Britain. One species is native, *L. ulmi*; two non-native species are established (at least temporarily) on protected plantings, *L. chinensis* and *Lepidosaphes pinnaeformis* (Bouché). The other eleven non-native species are not currently established in Britain.

The majority of the samples recorded here were collected by the Plant Health and Seeds Inspectorate (PHSI) during inspections of imported plant material for regulated pests.

Synonyms are only given below if they have been used in literature pertaining to scale insects in Britain. Complete synonymies are provided by Miller, Denno & Gimpel (2011).

Lepidosaphes beckii (Newman) – citrus mussel scale or purple scale

Synonym: *Mytilaspis flavescens* Targioni-Tozzetti

Lepidosaphes beckii is one of the most commonly imported scale insect species in Britain and often listed, incorrectly, as established in Britain (Danzig & Pellizzari, 1998). It is usually found on citrus (Rutaceae) fruit and has been imported into Britain since at least the nineteenth century (Douglas, 1886; Newman, 1869). It occasionally occurs in enormous numbers (hundreds of scales per fruit), particularly on produce imported for processing (usually juicing). It was frequently misidentified in Britain as *L. ulmi* up until the 1980s (e.g., Seymour, 1978). It has been recorded on

Rutaceae: calamondin (*Citrofortunella microcarpa* (Bunge) Wijnands), key lime (*Citrus aurantiifolia* (Christm.) Swingle), Seville orange (*C. aurantium* L.), pomelo (*C. maxima* (Burm.) Merr.), kaffir lime (*C. hystrix* DC.), lemon (*C. limon* (L.) Burm.f.), king mandarin (*C. nobilis* Lour.), grapefruit (*C. × paradisi* Macfad.), mandarin (*C. reticulata* Blanco), orange (*C. sinensis* (L.) Osbeck), ugli fruit (*C. × tangelo* J. W. Ingram & H. E. Moore), and *Citrus* spp. It has been found on plant material imported from Argentina, Bahamas, Bangladesh, Belize, Brazil, Cuba, Cyprus, Dominican Republic, Egypt, France, Ghana, Greece, Guyana, Honduras, Israel, Italy, Kenya, Jamaica, Lebanon, Malaysia, Mexico, Peru, St. Vincent and the Grenadines, South Africa, Spain, Sri Lanka, Swaziland, Syria, Taiwan, Thailand, Turkey, United States of America (USA), Uruguay, and Venezuela (Fera, unpublished records).

Bangladesh is a new country record for *L. beckii* (country of origin confirmed on the phytosanitary certificates) (CABI, 1982; Watson, 2002; Miller, Denno & Gimpel, 2011). The collection details are as follows: England, London, Heathrow Airport, on *Citrus* sp. imported from Bangladesh, 3.xi.2005, 14.xii.2005, 17.i.2006, 12.ix.2006, 31.viii.2008, 10.iii.2009, repeated interceptions during v–ix.2011 (PHSI).

Lepidosaphes chinensis Chamberlin – Chinese mussel scale

The first incursion is reported here.

Lepidosaphes conchiformis (Gmelin) – fig or red oystershell scale

Synonym: *Lepidosaphes minima* (Newstead)

Transient incursions of this species have occurred on figs (*Ficus carica* L., Moraceae) grown indoors and in well sheltered situations outdoors on several occasions (Newstead, 1901; Green, 1915, 1916). It was found at RHS Garden Wisley in 1916, xi.1920, vi.1921 and vii.1924; in Tenterden, Kent x.1938 (Malumphy & Badmin, 2012); and Greater London, Enfield, 1955–56. It is no longer known to occur in Britain.

Lepidosaphes cupressi Borchsenius

Transient incursion at a commercial plant nursery in Worplesdon, Surrey on Chinese juniper (*Juniperus chinensis* L., Cupressaceae) imported from Hong Kong, iii.1975 (Bowman, 1976).

Lepidosaphes flava (Signoret) – De Stefan scale

Transient incursion at The Eden Project, Cornwall, on olive (*Olea europaea* L., Oleaceae) grown indoors, October 1999.

Lepidosaphes gloverii (Packard) – Glover's scale

Lepidosaphes gloverii is very common on imported *Citrus* fruit (together with *L. beckii*), and is often listed incorrectly as established in Britain (Danzig & Pellizzari, 1998). It has been found on *C. aurantiifolia*, bergamot (*C. bergamia* Risso & Poit.), *C. hystrix*, *C. maxima*, *C. limon*, *C. × paradisi*, *C. reticulata*, *C. sinensis*, *C. × tangelo*, *C. sp.* and *× Citrofortunella microcarpa*. It has been found on plant material imported from Argentina, Bangladesh, Belize, Brazil, Cuba, Dominican Republic, Egypt, Ghana, Honduras, India, Indonesia, Israel, Italy, Jamaica, Kenya, Malaysia, Mexico, Pakistan, Philippines, South Africa, Spain, Thailand and the USA (Fera, unpublished records).

Bangladesh, Ghana and Uruguay are new country records for *L. gloverii* (country of origin confirmed on the phytosanitary certificates) (CABI, 1962; Miller, Denno &

Gimpel, 2011; Watson, 2002) and the collection details are as follows: England, Essex, Port of Tilbury, on *C. sinensis* imported from Uruguay, 31.iii.1998 (PHSI); Kent, Thamesport, on *C. sinensis* imported from Ghana, 12.ix.2011 (PHSI); London, Heathrow Airport, on *Citrus* sp. imported from Bangladesh, 3.xi.2005, 14.xii.2005, 11.iii.2007, 10.iii.2009 (PHSI).

Lepidosaphes laterochitinsa Green

It was originally described by Green (1925) from specimens collected from *Coelogyne* sp. (Orchidaceae) at the RHS Garden, Wisley, and consequently has often been incorrectly recorded as occurring in Britain. Transient incursions have been found at nurseries in Kent, on *Codiaeum* sp. (Euphorbiaceae) imported from Sri Lanka, March, 2009 (Malumphy & Badmin, 2012); and in Wales, Gwynedd, on ivy tree (*Schefflera heptaphylla* (L.) Fordin Araliaceae) imported from Taiwan, July, 2003 (Fera, unpublished records).

Lepidosaphes pini (Maskell) – Oriental pine scale

Transient incursion at a nursery on a bonsai Japanese white pine (*Pinus parviflora* var. *pentaphylla* (Mayr) A. Henry, Pinaceae) imported from Japan, June 1986 (Fera, unpublished record).

Lepidosaphes pinnaeformis (Bouché) – cymbidium scale

Synonym: *Lepidosaphes machili* (Maskell)

Established on *Cymbidium*, *Dendrobium* and other orchids (Orchidaceae) grown indoors. It is most commonly found in public botanic gardens, for example, at The Royal Botanic Gardens (RBG), Kew, Surrey, during 2000 and 2011, and may have been present in Britain for at least a century (Fernald, 1903). Other records include Birkenshaw, West Yorkshire, on *Cymbidium* sp., iv.1920 (Green 1921, 1925; Malumphy, 2009); Orchid House Havant, Hampshire, on *Cymbidium*, i.1930; Wisley, Surrey xii.1953; Horsham, West Sussex, xii.1953; and Berkhamsted, Hertfordshire, xii.1940.

It is also occasionally intercepted on imported orchids, for example, at the RBG Kew, on *Aeranthe* sp. (Orchidaceae) imported from Madagascar, ii.1995 (PHSI) (Fera, unpublished record). *Lepidosaphes pinnaeformis* is recorded here for the first time from Madagascar (country of origin confirmed on the phytosanitary certificate) (Mamet, 1959; Miller, Denno & Gimpel, 2011; Watson, 2002).

Lepidosaphes piperis (Green)

Transient incursion at a nursery in Somerset on black pepper *Piper nigrum* L. (Piperaceae) imported from India, xii.1998 (Fera, unpublished record).

Lepidosaphes rubrovittata Cockerell – guava scale

Transient incursion on guava (*Psidium guajava* L., Myrtaceae) plant imported from Jamaica, v.2003, for the RHS Chelsea Flower Show (Fera, unpublished record). It is recorded here for the first time from Jamaica (country of origin confirmed on the phytosanitary certificate) (Miller, Denno & Gimpel, 2011).

Lepidosaphes tapleyi Williams – guava long scale

This species has been commonly intercepted on mango (*Mangifera indica* L., Anacardiaceae) fruit imported from Pakistan since 1993, and on guava foliage and fruit imported from India since 2005. It has also been found on several occasions since 1993 on mango fruit imported from Gambia; on mangoes from Ghana, 1996

and 2010; on *Cordia dichotoma* G. Forst. (Boraginaceae) fruit from Kenya, xi.2006; and on sweet potato (*Ipomoea batatas* (L.) Poir., Convolvulaceae) foliage from Gambia, v.2005 (Reid & Malumphy, 2006). An incursion of *Lepidosaphes tapleyi* has occurred at the RBG Kew, on a *Caralluma* sp. (Asclepiadaceae) plant imported from Egypt, vii.1998 (Fera, unpublished records).

Lepidosaphes tapleyi Williams is recorded here for the first time from Ghana and Pakistan (country of origin confirmed on the phytosanitary certificates) (Miller, Denno & Gimpel, 2011; Watson, 2002), and collection details are as follows: England, Heathrow Airport, on mango from Ghana, 6.xi.1996, 13.x.2010 (PHSI); West Sussex, Gatwick Airport, on mango fruit from Pakistan, 28.vi.1998, 7.ix.1999 (PHSI).

Lepidosaphes tokionis (Kuwana) – croton scale

Several transient incursions of *L. tokionis* have occurred in England. It has been found in Greater London, on croton cuttings (*Codiaeum variegatum* (L.) Rumph. ex A. Juss., Euphorbiaceae) imported from Singapore, vi.2011; West Sussex, on croton from Sri Lanka, iii.1971; Cheshire, Birkenhead, on a tropical shrub imported from Grenada, v.1975 (Bowman, 1976); Greater Manchester and West Midlands, on croton from Singapore, xi.1980 (Seymour & Kilby, 1980); Lincolnshire on croton of unknown origin, i.1999, and from Sri Lanka, iv.2003. A scale suspected to be *L. tokionis* has also been found at the RBG, Kew, on *Celastrus* sp. (Celastraceae) from China, xi.1985 (Seymour, Davis & Roberts, 1986).

Lepidosaphes ulmi (L.) – mussel scale

Lepidosaphes ulmi is common throughout Britain and broadly polyphagous on woody hosts, especially Rosaceae (Malumphy, 2009). Populations are often larger, and therefore more noticeable, in urban gardens. It is an occasional pest of Buxaceae: box (*Buxus* spp.). Rhamnaceae: ceanothus (*Ceanothus* sp.). Cornaceae: common dogwood (*Cornus sanguinea* L.). Rosaceae: rock cotoneaster (*Cotoneaster horizontalis* Decne.); hawthorn (*Crataegus* spp.); apple (*Malus domestica* Borkh.); pear (*Pyrus communis* L.); cherry (*Prunus avium* (L.) L.); rose (*Rosa* spp.), and many other plants. It is also occasionally intercepted on imported plant material, for example: apple from Iran, 1985 (Seymour, Davis & Roberts, 1986); pear from Italy, 1976 (Seymour, 1978); and bay laurel (*Laurus nobilis*) from Belgium, 1976 (Seymour, 1978).

Lepidosaphes yanagicola Kuwana – yanagicola oystershell scale

Transient incursion at a nursery in Wiltshire, on 24 willow *Salix* sp. (Salicaceae) cuttings imported from Japan, 6.ii.1986.

Lepidosaphes spp.

There is a very large number of other interceptions records (too many to be listed in this paper) of *Lepidosaphes* species undetermined found in association with imported plant material, which are likely to represent species not listed above.

DISCUSSION

This is the first published incursion of *L. chinensis* in Britain (and Europe). The biology of this species is largely unknown but it is polyphagous, feeding on plants belonging to at least eight families (with a preference for Asparagaceae and Orchidaceae), and appears to be multivoltine. It is primarily a tropical and sub-

tropical species that is unlikely to be able to naturalise (over-winter outdoors) in Britain, but could establish on indoor plantings (for example, on *Dracaena* spp., orchids, mother-in-law's tongue, and yucca). It could easily be overlooked, as it resembles other *Lepidosaphes* species that are already present in Britain and continental Europe. It is not, however, recorded as an economic pest in its native range (Asia), although it could be more damaging in new geographical areas where its natural enemies are absent.

Fourteen *Lepidosaphes* species have been detected in Britain: one species is native, two non-native species are currently known to be breeding in Britain, and eleven are non-established introductions. The free movement of plants within the Europe Union provides a pathway for the continual introduction into Britain of *L. beckii* and *L. gloverii* on ornamental citrus, and *L. conchiformis* on fig from the Mediterranean, where all three *Lepidosaphes* species are common. In June 2011, croton plants imported from Sri Lanka were found to have a moderate infestation of *L. tokionis*. It is possible that in the future, these and other non-native species of *Lepidosaphes* will be accidentally introduced into Britain, although the majority of non-native species will be restricted to indoor plantings and are unlikely to have a significant negative economic impact on UK agriculture, horticulture, forestry or biodiversity.

Any findings of suspected non-native plant pests should be reported to the local Fera PHSI office or to the PHSI HQ, York (Tel.: 01904 465625).

ACKNOWLEDGEMENTS

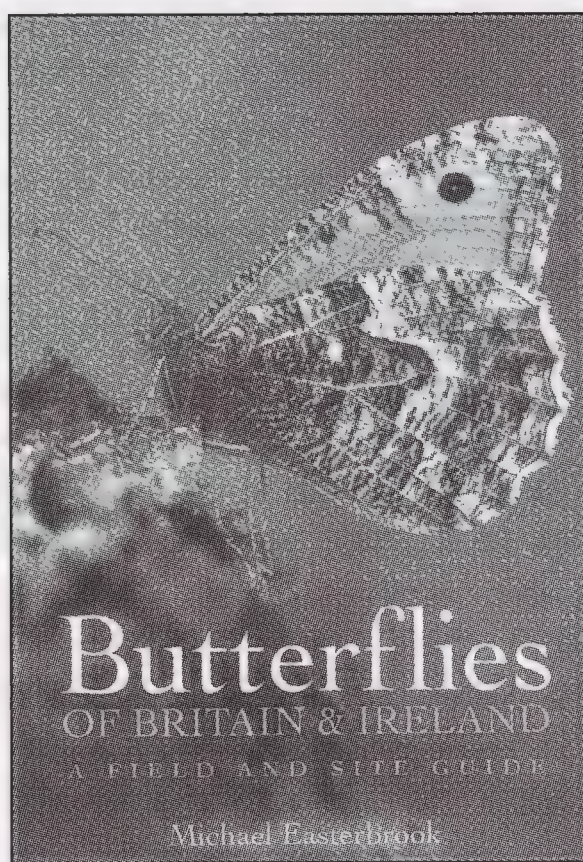
The authors would like to thank Maurice Jansen of the Plantenziektenkundige Dienst, Sectie Entomologie, Wageningen, for providing details of the interceptions of *L. chinensis* in the Netherlands, and for photographs of the insect; and to James Armitage of the RHS for checking the plant taxonomy. Many of the *Lepidosaphes* specimens were identified or confirmed by Doug Williams and Gillian Watson, formerly of the International Institute of Entomology, CAB International. This work was partially funded by the Department for Environment, Food and Rural Affairs.

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BOOK REVIEWS

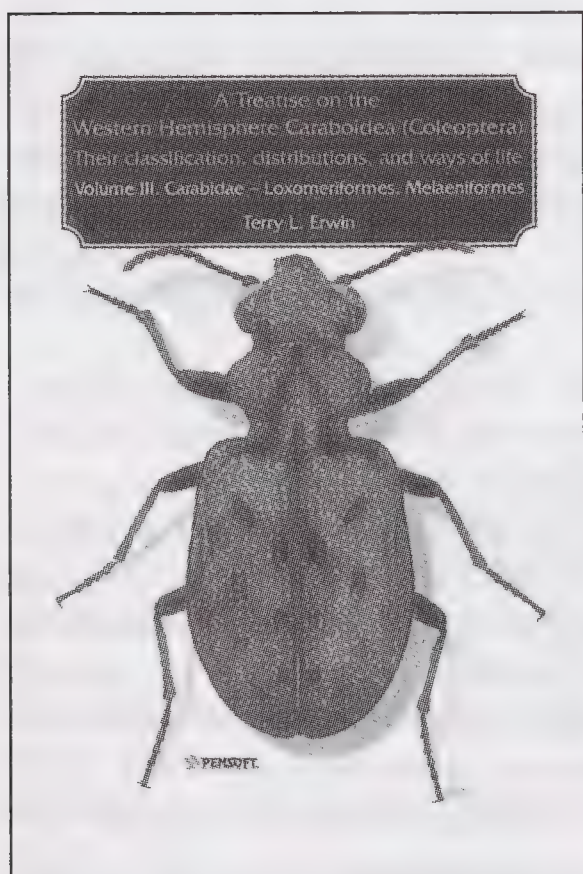


Butterflies of Britain and Ireland by Mike Easterbrook. (A & C Black, 2010) Softback. 352pp., 300+ colour photographs. £29.99. ISBN 978-1-4081-2770-4.

The author has written several popular books on butterflies and has been butterfly recorder for Kent for many years and knows his subject. This modern book, bristling with colour photographs, covers all the butterfly species found in Britain and Ireland, with details of their biology and distribution, habitat requirements, flight periods, descriptions of life stages, life cycles and behaviour. There are interesting accounts of the efforts undertaken to conserve our native fauna, some successful, others less so. Changes in distribution of selected species over the period of the last century or so are discussed in relation to climate change, agricultural intensification, urbanisation, fragmentation and loss of habitat, habitat

quality and hostplant preferences. The last section, of great practical use, is a comprehensive guide to where to find each species of butterfly with a listing of localities, county by county, with details of how to get there and what species to see at each site.

JOHN STEWART



A Treatise on the Western Hemisphere Caraboidea (Coleoptera) Their classification, distributions, and ways of life. Volume III. Carabidae, Loxomeriiformes, Melaeniformes by Terry L. Erwin. Pennsoft, 2011. 412pp. Hardback. 75 Euros. ISBN: 9789546426024.

This is a review of the taxonomy, distribution and status of the ground beetles of the Western Hemisphere. For each taxon, information is given on historical taxonomy, national and regional distribution and current status for all countries in Europe. The text covers macro- and micro-habitat preferences, dispersal abilities and seasonal occurrence. The sections on ecology cover altitudinal distribution (m) and general altitudinal classification and abundance. The chapters on behaviour include notes on diel activity, adult/larval hibernation, prey items, immatures and general patterns of over-wintering.

Details of dispersal power in relation to distribution, i.e. wing condition, flight data, walking, running, swimming, and climbing records are reviewed. This work, planned as a ten-volume companion to Laroche & Larivière (2003), will be an indispensable tool for anyone interested in the biology of European ground-beetles, as well as their role as ecosystem providers in agriculture, conservation and forestry.

JOHN BADMIN

DRYODURGADES ANTONIAE
(HEMIPTERA-AUCHENORRHYNCHA: CICADELLIDAE)
NEW TO BRITAIN

TRISTAN BANTOCK¹ & PETER HARVEY²

¹101 Crouch Hill, London N8 9RD Email: tristanba@googlemail.com

²32 Lodge Lane, Grays, Essex RM16 2YP Email: grays@peterharvey.freemove.co.uk

ABSTRACT

The cicadellid leafhopper *Dryodurgades antoniae* (Melichar) is reported new to Britain from several sites in south-east England. It was found on common broom *Cytisus scoparius*, its host plant in mainland Europe.

INTRODUCTION

On 12.viii.2008 PH collected an unfamiliar leafhopper from common broom *Cytisus scoparius* at Stanford-le-hope (TQ6981) in south Essex (VC18). This was later identified by Peter Kirby as *Dryodurgades antoniae* (Melichar), the first time this species has been found in Britain. PH subsequently recorded the species on common broom at two nearby sites: an old sandpit near Linford (TQ6779) on 19.viii.2009 and at another location near Stanford-le-Hope (TQ6882) on 26.viii.2010 (Harvey, 2010). Further inland, TB found *D. antoniae* in VC18 at Wanstead Flats (TQ403865), where it was first recorded on 8.ix.2009 and then on several dates during 2010 and 2011, all in August and September. Several specimens were also collected by TB in west London on Hounslow Heath (VC21) (TQ119743), where the species was first recorded on 25.ix.2010, but not during several visits in 2009. At both these sites *D. antoniae* was associated with extensive stands of common broom *Cytisus scoparius* (L.) Link. growing in dry acid grassland, which support a rich hemipterous fauna confined to this foodplant including *Gargara genistae* (Fabr.) (Auchenorrhyncha: Membracidae) and *Dictyonota fuliginosa* Costa (Heteroptera: Tingidae).

There are six British representatives within the subfamily Agalliinae (Le Quesne & Payne, 1981), although one of these, *Austroagallia sinuata* (Mulsant & Rey) is known only from a single record last century and may not be truly native (Kirby, 1992). The remaining five species belong to the closely allied genera *Agallia* and *Anaceratagallia*, which are all less than 4.0 mm in length and are predominantly brownish with variable black markings. Several of these are markedly terrestrial and associated with various low-growing plants; they can be frequent in pit-fall samples. With the exception of *Agallia brachyptera* (Boheman), they are very similar in appearance and best distinguished with reference to the shape of the male aedeagus, which forms a simple curve. In contrast, the genitalia of the seven European species of *Dryodurgades* are branched, with antler-like apical appendages. The two species found in central Europe are both slightly larger than 4.0 mm and have distinctive external markings, as well as very specific foodplant associations; *D. reticulatus* (Herrich-Schäffer) on fine-leaved vetch *Vicia tenuifolia* Roth (a casual in England) and *D. antoniae* on common broom *C. scoparius*.

DESCRIPTION

Length: ♂: 4.5 mm ♀: 5.0–5.3 mm. *Dryodurgades antoniae* is a strikingly marked leafhopper which is easily recognised in the field (Plate 6, Fig 1). It is always

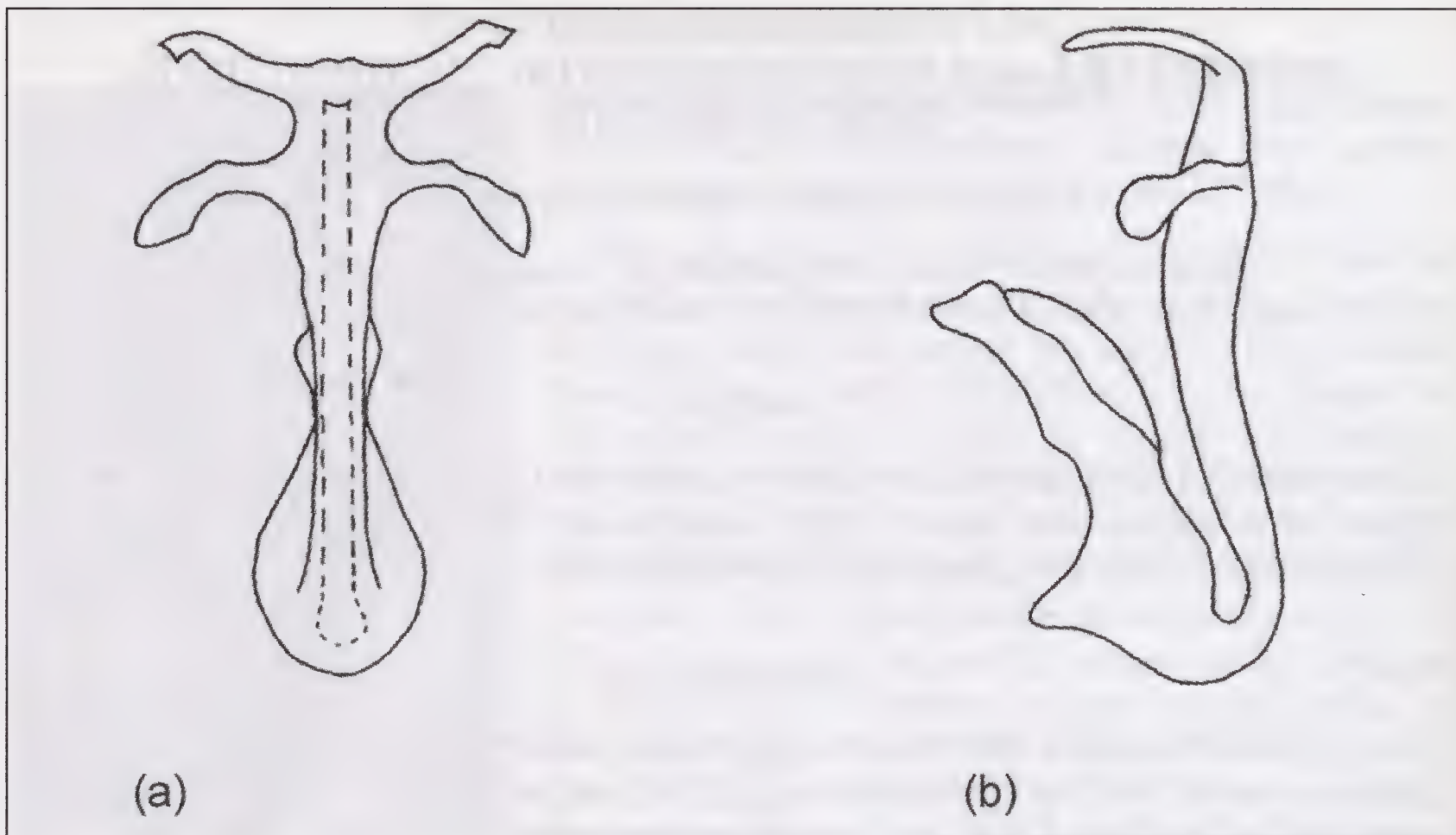


Fig. 1 (a) dorsal and (b) lateral view of aedeagus (after Biedermann & Niedringhaus, 2009)

macropterous, with whitish forewings in which the cells of the clavus are uniformly black. The forewing veins are dark below the claval suture. The pronotum is yellowish-white and marked with three longitudinal black stripes, which do not reach the margins. The black and white face pattern is particularly characteristic (Plate 6, Fig. 2). The ocelli are set in black spots, which are joined to broad black stripes bordering the eye by a narrow black line. There are large black thyridial spots on the upper margin, which are visible from above.

The male genitalia of *D. antoniae* are illustrated (Fig 1a & 1b); the aedeagus is branched and bears two pairs of appendages.

ECOLOGY & DISTRIBUTION

The European distribution of *D. antoniae* includes the Netherlands, France, Spain and Portugal (Nast, 1972) and extends as far west as parts of Germany (Kunz, Nickel & Neidringhaus, 2011). As such, the species is probably at the northern edge of its range in Britain. The ecology and phenology of *D. antoniae* populations reported here seems consistent with those in Germany, where the species is monophagous on common broom and has a single generation between August and October, overwintering as an egg (Nickel, 2003).

The arrival of *D. antoniae* in the south-east of Britain is most easily explained by natural range expansion from the near continent, itself a possible consequence of gradual climatic change. A pathway involving assisted introduction seems much less likely, since common broom is not a frequent horticultural import.

In the short term, *D. antoniae* is likely to remain confined to southern England where its requirements for large stands of broom, growing in open, sunny situations are best met on lowland heathland or acid grassland. Since it has crossed the London area with such rapidity, it would seem poised to continue dispersing inland, where suitable habitat must surely exist on the Surrey heathlands and beyond.

ACKNOWLEDGEMENTS

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SHORT COMMUNICATION

The status of Stag Beetle *Lucanus cervus* (Coleoptera: Lucanidae) in Gloucestershire. – The Stag beetle *L. cervus* (L.) has been known to have resident populations in Gloucestershire since the late 19th century (Atty, 1983). Some of the old foci survive today but others appear to have been lost. As part of one of the larger populations outside S.E. England (Smith, 2011), the status of these populations has national resonance and merits documentation. Atty (*loc. cit.*) knew of no modern reports, with 1969 the latest. However, following national publicity associated with the Great Stag Hunt (People's Trust for Endangered Species), new reports have been initiated from some of the very same historic areas. Its continued presence was drawn to the attention of nature conservationists in 1998, after a gap of 30 years.

In Gloucestershire Stag beetle is primarily found along the Vale of Gloucester and in the Newent area in the north-west of the county. It appears never to have been known from the higher ground of the Cotswolds nor from the ancient Forest of Dean. The old sites around the major conurbations of Cheltenham and Gloucester have not been confirmed in recent years, suggesting a loss from the most urban areas of the county.

Current populations:

Newent (SO7226), male in collections of Gloucester Museum dated 29.vi.1952; Newent High Street, male collected, 23.vi.1998. Newent, male in garden in town centre, 27.vi.2000 & vii.2006; in flight at dusk, 24.vi.2010; The Tythings, Newent, male in a chicken run in garden, 19.vi.2009; Tewkesbury Road, Newent, 16.vi.2009.

Also in villages to north: Redmarley (SO7531), male, 25.viii.1939. Ryton (SO7332), very abundant in area, 1959–68; dead male on woodland path, 4.vii.2009. Bromsberrow (SO7433), commonly, 1999 and 2000; present 2001 & 2.vi.2005.

Vale of Gloucester

Apperley (SO8125), male, 1935; rediscovered breeding in an old ash pollard in the boundary of a garden here in 1998; female 2010 and male, found by pupils of Apperley Primary School; 8.vi.2011.

Corse Lawn (SO8330), male, 24.vii.1943; Tirley (SO8328), over ten emerging from one stump, 21 & 22.vi. & 24.vii.2001.

There is also an old record for 'Newnham' thought to date from about 1900. This village lies on the River Severn immediately to the south of the Forest of Dean.

Locations only with old records are concentrated around Cheltenham and Gloucester: Cheltenham (SO92), 3, 1887–90; Birdlip (SO9214), male, 27.v.1912; Shurdington (SO9218), male and female, 1956; Down Hatherley (SO8622), male flew into house, 1967; Gloucester, male picked up in city centre, 1969; Quedgeley (SO8113), late 1960s/early 1970s; Leckhampton (SO9419), male and female in garden 'more than five years previously'. It is possible however that a small localised population may survive on the fringes of the conurbation as a single isolated record was reported from Barnwood (SO855180), 16.viii.2009.

One other modern record comes from the south Cotswolds: Rockness, Nailsworth (ST845989), 7.vi.2010. Isolated records such as this are difficult to interpret and need to be supported by more information in order to demonstrate the presence of a resident breeding population.

The experience in Gloucestershire appears therefore to be very different to that from the London area and calls in question some of the assumptions made for that centre of population. The Gloucestershire population as a whole is not urban or suburban, it is in small country villages along the rising ground of the Severn flood plain and in one small market town, Newent. The beetle appears to have been lost from the major conurbation of Cheltenham and Gloucester, with its extensive developing suburbs. And yet, there are very common features between the London and Gloucestershire populations:

- Floodplains of large river catchments, especially lower reaches, low altitudes;
- Areas which have avoided the damaging impacts of modern industrialised agriculture and modern urban development, albeit affected periodically by small-scale development over the centuries.

Floodplains are perhaps significant for their accumulations of waterborne woody debris from large catchments and washings of silt which partially bury this wood, creating ideal conditions for *L. cervus* larval habitat. The availability of buried or partially buried wood is likely to be much greater in and around small settlements than in the larger towns or in the open countryside. – KEITH N. A. ALEXANDER, 59 Sweetbrier Lane, Heavitree, Exeter EX1 3AQ.

ACKNOWLEDGEMENTS

The records arise from species recording by members of the Gloucestershire Naturalists Society and the Gloucestershire Wildlife Trust. Thanks to Linda Moore of the Gloucestershire Centre for Environmental Records.

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PARACOLOPHA MORRISONI (HEMIPTERA: APHIDIDAE, PEMPHIGINAE), AN ASIAN APHID ESTABLISHED IN BRITAIN

CHRIS MALUMPHY

The Food and Environment Research Agency, Sand Hutton, York, YO41 1LZ, UK
chris.malumphy@fera.gsi.gov.uk

ABSTRACT

Paracolopha morrisoni (Baker) is an Asian aphid that host alternates between leaf galls on *Zelkova serrata* (primary host) and bamboo roots (secondary hosts). Large infestations of *P. morrisoni* have been repeatedly found on bamboos (*Phyllostachys* and *Pleioblastus* spp.) at commercial nurseries in England (Greater London, Hampshire, Lincolnshire, Warwickshire, Worcestershire) since 1998. It has been intercepted in England on bamboo plants imported from Belgium, the Netherlands and Italy, supporting the hypothesis that it is already widely established in Europe, at least at commercial premises. Only wingless, permanently parthenogenetic aphids on the secondary host have been found in England, with the exception of a single immature winged remigrant (the form that migrates from the secondary to primary host). This is the first time that collection details for *P. morrisoni* for anywhere in Europe have been published. The wingless adult from the secondary hosts is illustrated and the geographical distribution, host range, biology and economic importance of *P. morrisoni* are reviewed.

INTRODUCTION

Paracolopha morrisoni (Baker) (Hemiptera: Aphididae, Pemphiginae) is an Asian aphid that host alternates between leaf galls on keyaki *Zelkova serrata* (Thunb.) Makino (Ulmaceae) (primary host), and bamboo roots (Poaceae, tribe Bambuseae) (secondary hosts). It has been found repeatedly on the roots of bamboo plants in England since 1998, and was recorded from Britain by Smith *et al.* (2007) in a table listing non-native invertebrate plant pest establishments between 1970 and 2004. However, no further details were provided and this record was not subsequently noted by other researchers, for example, by Coeur d'Acier, Pérez-Hidalgo & Petrović-Obradović (2010), who reviewed all alien aphid species established in Europe, or by Fauna Europaea (www.faunaeur.org), which lists all aphid species recorded in Europe. The purpose of this communication is to clarify the status of *P. morrisoni* in Britain (and Europe), to re-illustrate the wingless adult from the secondary hosts to enable identification of European populations, and to review its geographical distribution, host range, biology and economic importance.

PARACOLOPHA MORRISONI IN BRITAIN

The Food and Environment Research Agency (Fera) received 19 samples of bamboo roots infested with *P. morrisoni* between December 1998 and January 2012. Seventeen of these samples were collected by the Plant Health and Seeds Inspectorate (PHSI) during phytosanitary inspections at commercial nurseries, and two samples were received from ADAS. Collection details for the PHSI samples are as follows (only wingless adults from secondary hosts were collected, unless indicated otherwise):

ENGLAND. **Hampshire**: commercial nursery A, on golden bamboo *Phyllostachys aurea* Riviere & C. Riviere, 16.xii.1998 (Fera ref. 987404), black bamboo *P. nigra* (Lodd. ex Lindl.) Munro (from Pistoia, ITALY), 28.iii.2000 (Fera ref. 2001994), yellow grove bamboo *P. aureosulcata* McClure ‘Spectabilis’ (from Rijkevorsel, BELGIUM), 28.iii.2000 (Fera ref. 2001995), running giant bamboo *P. vivax* McClure ‘Aureocaulis’ (from CHINA), 17.iv.2002 (Fera ref. 2021949) (leg. R. Whittaker of the PHSI); nursery B (bamboo root-aphids were widely distributed at the site), on *P. vivax* (from the NETHERLANDS), 2.xii.1998 (Fera ref. 987064), Japanese timber bamboo *P. bambusoides* Siebold & Zucc. (Fera ref. 987290), *P. nigra* (large specimen plant from the USA that had been at nursery since 1987) (Fera ref. 987291), *P. aurea*, 19.xii.1998 (Fera ref. 987292), and *P. bambusoides*, 14.i.1999 (Fera ref. 990221) (leg. R. Whittaker). **Greater London**, Uxbridge, nursery, on *P. aurea* (Fera ref. 990455) and pygmy bamboo *Pleioblastus pygmaeus* (from ITALY, 1997), 28.i.1999 (Fera ref. 990456 and 990457), on *P. nigra* (from ITALY, 1998), 11.i.1999, (Fera refs. 990119 and 990120) (leg. D. Koerper of the PHSI). **Lincolnshire**, nursery, on *P. aurea*, 31.i.2012 (from Pistoia, ITALY) (Fera ref. 21201555) (leg. R. Hindley of the PHSI). **Warwickshire**, nursery, on *P. vivax* ‘Aureocaulis’ (suspected to have been imported from the REPUBLIC OF IRELAND), 9.x.2000 (Fera ref. 2006414 – one immature sexupara present) (leg. A. Kirby of the PHSI). **Worcestershire**, nursery, on *Phyllostachys* spp., 6.i.1999 (Fera ref. 990056) (leg. A. Kirby).

Statutory action was taken at commercial premises in England to eradicate the aphid when it was first found in the 1990s. However, statutory measures were discontinued for the following reasons: a survey of bamboo plants carried out by the PHSI determined the aphid to be widespread in England at commercial premises; there was no control over its pathway of introduction from other member states within the European Union (EU); it was assessed to have a negligible economic or environmental impact in Britain; and eradication was not practical. There can be no doubt that infested plants have been sold and planted in private and public gardens in Britain. One experienced nursery owner who specialised in bamboo informed the PHSI in 1998 that he had been aware for several years of white wax infestations on bamboo roots, without knowing the cause, and thought that the problem was common in the bamboo trade, not only in Britain but in other EU countries. The date of the first introduction of the aphid into Britain is unknown, but it is likely to have been earlier than 1998, as the aphid is highly cryptic (being subterranean) and difficult to detect. One large specimen *P. nigra* infested with root aphid had been imported from the USA in 1987. Although the source of the aphid infestation cannot be determined due to the lapse in time, the wingless adults on secondary hosts have a low natural dispersal potential, and the aphid may have been introduced with the plant in the 1980s.

DETECTION AND IDENTIFICATION

In all but one case, only wingless, permanently parthenogenetic aphids on the secondary host have been found in England. They are globular, pale yellow, with greyish legs and antennae (Plate 6, Fig. 3), and are covered with long white, wax strands excreted from dorsal wax-gland plates (Plate 6, Fig. 4). The wax strands coalesce to form a white coat that protects and hides the aphids (they can be very difficult to see under the wax layer, even with an $\times 15$ hand lens). It is the wax layer that smothers the fine roots that is likely to be detected first.

The aphid was first identified in the UK in the 1990s while the Plant Health and Seeds Inspectorate conducted a survey of bamboo pests. The number of recent

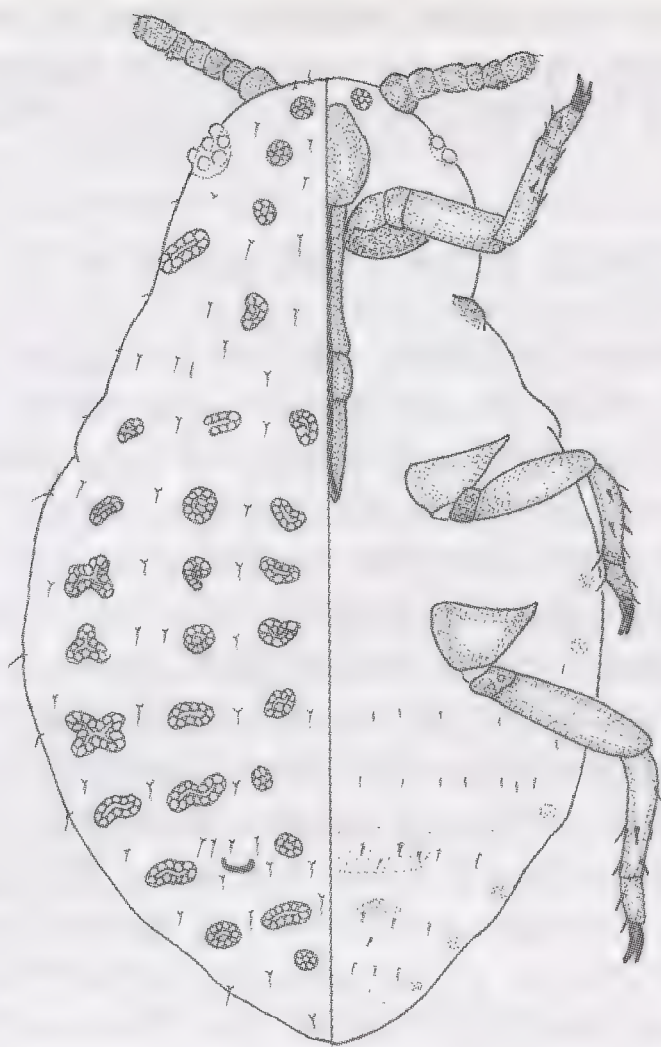


Fig. 1 *Paracolopha morrisoni* wingless adult from a secondary host; dorsal view on left and ventral view on right. The specimen illustrated has eight ommatidia in each eye although the typical number is three.

findings is low because bamboo plants are freely moved within the European Union and are not routinely inspected by the Plant Health and Seeds Inspectorate. There are also practical difficulties with inspecting the roots of large bamboos because of the weight and height of the plants (Richard Hindley, pers comm., 2012). They are difficult to remove from their pots and the roots are frequently pot-bound and very tightly packed.

Paracolopha morrisoni wingless adults from the secondary hosts can only be identified accurately by microscopic examination of a slide-mounted specimen. An example is illustrated here (Fig. 1) to enable European populations to be identified. There are no other *Paracolopha* species present in Europe and it is unlikely to be confused with any other species.

Exule (wingless) adult aptera (Fig. 1): slide-mounted specimen, body elongate, posteriorly broadly rounded, membranous, 1.5–1.8mm long and 1.0–1.2mm wide; wax gland plates in six longitudinal rows over most of the dorsum. Eyes variable, indistinct to conspicuous, with three ommatidia (occasionally 8–12 ommatidia). Antennae, legs, and rostrum sclerotised. Antennae short, 5–6 segmented, highly variable, third segment typically the longest. Apical segment with primary (large) and accessory (small) rhinaria, processus terminalis undeveloped. Penultimate segment with a rhinarium. Rostrum reaching middle coxae. Setae on tibia and tarsus spine-like. Claws large, stout, sharply curved. Wax gland plates nearly circular on head, circular to oval on thorax, and variable, often irregular on abdomen. They usually consist of a closed central field, although occasionally this is open, and circumferential cells. The circumferential cells are variable, ranging from circular, oval to pear-shaped. Cornicles present on tergite V, with a horseshoe-shaped rim. Genital and anal plates rather indistinct. Cauda short, broad, with one pair of setae.

This species has a complex synonymy which is listed by Akimoto (1985). Detailed descriptions of adults and first instars are provided by Akimoto (1985). *Paracolopha morrisoni* may be keyed out with Blackman & Eastop (1994).

HOST PLANTS AND BIOLOGY

The biology of *P. morrisoni* has been studied in Japan (Akimoto, 1985, 1996). Overwintered eggs hatch early in spring synchronously with the budburst of *Z. serrata*. It forms a closed petiolate-globular gall (i.e., club-shaped with a narrow stem and a swollen, roughened apex) on the upper surface of the leaf lamina between the veins. Several galls may occur together on the same leaf. The fundatrix produces a few soldier aphids (defensive larvae) in addition to an average of 21 normal larvae in the closed gall. The soldiers are first instars that attack insect predators with their stylets. The soldiers do not moult to the second instar and are therefore sterile. Such a small number of defenders may be effective in counter-attacking small predators which tunnel and invade galls. Winged adults emerge in June–July from the ripe opened galls and colonize roots of *Sasa* bamboo. The wingless aphids on the secondary hosts may pass through a number of generations during the summer. Winged, mating adults return to *Z. serrata* in September to October. Galls on *Z. serrata* occur in Japan and southern China, but have not been found in Britain or North America.

Secondary bamboo hosts include giant cane *Arundinaria gigantea* (Walter) Muhl., *Phyllostachys aurea*, *P. nigra*, *P. aureosulcata*, *P. vivax*, *P. bambusoides*, *Phyllostachys* sp., *Pleioblastus pygmaeus* and *Sasa* sp..

The larvae of the flea weevil *Orchestes hustachei* (Coleoptera: Curculionidae) feed on *P. morrisoni* within the galls (Yamazaki & Sugiura, 2001; Tomisawa & Akimoto, 2004).

GEOGRAPHICAL DISTRIBUTION

Paracolopha morrisoni is native to Asia and occurs widely in Japan (where it is one of the most common gall-forming insects), southern China and Taiwan (Akimoto, 1985). Non host alternating populations have been introduced into the USA (Maryland, South Carolina and southern California) (Baker, 1919; Hille Ris Lambers, 1966) and the UK (England) (reported here). It has also been intercepted in England on bamboo plants imported directly from Belgium, Italy and the Netherlands. One infested consignment of bamboo plants was suspected to have been imported from the Republic of Ireland. It is likely to be already widespread in Europe, wherever ornamental bamboos (particularly *Phyllostachys* spp.) are grown.

ECONOMIC IMPORTANCE

Paracolopha morrisoni feeds on the plant phloem, which may weaken the host. However, it is not recorded as an economic pest and is unlikely to have a noticeable negative impact in Britain. Large infestations have been found in Britain on the roots of bamboo plants exhibiting yellowing and poor growth, but in most cases the plants have also been infested with other aphids (*Takecallis* spp.), mites (*Schizotetranychus celarius* (Banks)), mealybugs (*Balanococcus kwoni* Pellizzari & Danzig) and armoured scale insects (Diaspididae), feeding on the foliage, which may have been responsible for the symptoms.

CONCLUSION

Paracolopha morrisoni is an Asian aphid that has been accidentally introduced to Europe with the trade in ornamental bamboo plants. It is established in Britain, and has been found on plants imported directly from Belgium, Italy and the Netherlands. It is possible that it is already widely distributed in Europe, but is overlooked due to the subterranean habit of the wingless adults on secondary hosts. Attributes that have facilitated its naturalization in new areas after accidental transport on host plant material include: small size; subterranean habit; oligophagy on perennial bamboos; parthenogenesis; and a high biotic potential (multiple generations each year). With the current information available, it appears to have little potential for a negative impact within Europe, with the exception of occasional harm to individual ornamental bamboo plants. Its primary host *Z. serrata* does not occur naturally in Europe, but penjing (pruned miniature trees) of *Z. serrata* are imported from China and Johnson & More (2004) describe it as 'Locally quite frequent as a quietly classy younger tree'. Although galls have not been detected in Britain, inspection of *Z. serrata* in gardens and parks would be worthwhile, and may result in the discovery of other invasive insects that have become established on this host.

ACKNOWLEDGEMENTS

Paracolopha morrisoni was first identified in England by Roger Hammon, formerly of the Central Science Laboratory (now part of Fera) and confirmed by Dr Gillian Watson, formerly of the International Institute of Entomology, London. Roger Hammon also provided useful information on the status of *P. morrisoni* in Britain. I would like to thank my daughter Isabel Malumphy (aged 7) for assisting with the drawing of the wax-gland plates. This work was partially funded by Defra.

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SHORT COMMUNICATION

Canthophorus impressus (Horváth) (Hemiptera: Cydnidae) in Wiltshire. – On 26.iii.2012 I visited Great Cheverell Hill on Salisbury Plain in order to photograph the larval webs of the marsh fritillary butterfly *Euphydryas aurinia* (Rottemburg) which is known to occur there. The site is a former reserve of the Wiltshire Wildlife Trust [WWT], but is now managed by the Ministry of Defence. Whilst I was in the process of photographing I realised there were large quantities of Bastard-toadflax *Thesium humifusum*, the hostplant of the local shield bug *Canthophorus impressus* and set about finding it. Although it was a bit like searching for the proverbial needle in a haystack I eventually saw a tiny metallic blue-green bug scurrying around in the short turf and on looking closer realised it was *C. impressus* (Plate 7, Fig. 1). This shieldbug (also known as the Down shieldbug) is on the edge of its range and has only been recorded from a few southern counties in Britain (Kirby, 1992). Within Wiltshire there have been 46 sightings from 24 locations. All of these are on chalk grassland encompassing the North Wessex Downs and Salisbury Plain. Prior to my record, *C. impressus* has been seen only twice post millennium – at Cockey Down and Coombe Bisset Down [both WWT reserves]. The most recent previous record from Great Cheverell Hill was 14.vii.1990 (Wiltshire and Swindon Biological Records Centre database). Searching revealed a further nine specimens along a small (10m) stretch of sheep terracing so it would appear the area supports quite a healthy population of this species. The juxtaposition of short grazed turf and bare, disturbed ground caused by sheep traversing the hillside agrees well with the preferred habitat requirements for *C. impressus* described by Kirby (1992). That the species is still present at this site after a recording gap of 22 years gives hope that it is still present at many, if not all, of its previously recorded sites in Wiltshire.

Recent studies of this species have led to a significant name change. The bug is referred to as *Sehirus* [*Canthophorus*] *dubius* (Scopoli) in Southwood and Leston (1959) and Kirby (1992). On mainland Europe, there is a group of eight similar species: *S. dubius* is assumed to be widespread at lower altitudes and the morphologically similar *C. impressus*, a montane species. Field research has revealed that *C. impressus* occurs at much lower altitudes in southern Germany than previously thought with a range obviously overlapping that of *S. dubius*. Then it was reported that the male genitalia of six modern and historical specimens of *S. dubius* from Britain corresponded to *C. impressus* (Nau, 2002). All eight *Canthophorus* species in mainland Europe look remarkably similar and cannot be separated on field characters alone but can easily be separated by dissection. Where both *C. impressus* and *C. dubius* co-occur, they can feed on the same species of *Thesium*, but it is likely that both have a tendency to feed on different *Thesium* species across their respective ranges. – STEVE COVEY, 130, White Edge Moor, Swindon, Wiltshire. SN3 6LY.

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THE VISUAL FIELD OF SWARMING MALE *EPISYRPHUS BALTEATUS* (DIPTERA: SYRPHIDAE)

JOLYON ALDERMAN

*Landscape and Biodiversity Research Group, School of Science and Technology,
University of Northampton, Newton Building, Avenue Campus, Northampton NN2 6JD
email: jolyon.alderman@northampton.ac.uk*

ABSTRACT

One of the challenges faced by swarming Diptera is that of detecting and identifying an approaching flying insect on the basis that it may present a potential mating opportunity. This paper discusses the measurement of the visual field and orientation changes exhibited by males of the common swarming hoverfly *Episyrphus balteatus* (De Geer). The visual field extended 320 degrees in the horizontal plane and 315 degrees in the vertical plane. The probability of detecting an approaching flying insect was an estimated 0.97. Members of the swarm turned 25 degrees at each change in orientation. Changes in orientation are a proposed method of placing an approaching insect within the visual field of the dorsal fovea for early recognition. This enables male *E. balteatus* to initiate a chase without the reaction response and consequent delay which would otherwise occur.

INTRODUCTION

Those insects that rely on vision to recognise and react to particular situations, do so using a combination of the physical attributes of their compound eyes and neurological processing of the received visual signals to instigate an appropriate behavioural response (Buschbeck & Strausfeld, 1997; Matthews & Matthews, 2010). One of the key behavioural responses in swarming flies is that of chasing other flying insects that approach the swarm or other swarm members that get too close. In both cases, chases are triggered by the detection and recognition of another flying insect that has entered the swarming fly's visual field (Alderman, 2008).

As flying insects can approach the swarm from any direction, the possession of a wide visual field by a swarming fly would be an obvious and desirable aid to detection (Switzer & Eason, 2000). The wider the better, but as it is unlikely that any fly has a 360 degree visual field (although the pipunculids may come close), changes in orientation will be required if all possible approach directions are to be kept under observation. The number of degrees turned during each change in orientation, along with the time between each change will in turn affect how much and how quickly the swarms' surroundings can be observed. Other aspects of the detection process include the distance at which approaching flying insects can be recognised as such and the velocity at which they approach.

The hoverfly *Episyrphus balteatus* (De Geer) makes an ideal subject for researching swarming behaviour (Alderman, 2008; Alderman, 2010a; Alderman, 2012). The species is easy to identify in the field and can be found in the UK throughout the year, with the main flight period running from July through to September (Dean, 1982; Chambers *et al.*, 1986; Ball & Morris, 2000). Males commonly form aerial swarms in woodland clearings where individuals can be seen hovering, basking and chasing, with the swarms as a whole changing orientation at regular intervals (Alderman, 2010a). As a step towards further understanding the swarming behaviour of Diptera, this paper describes and discusses field-based measurements of both the

extent of the visual field of male *E. balteatus* and the number of degrees turned during each change in orientation.

METHODS

Definitions

It is useful in a study of this nature to first define some of the basic terms that are used in the text. The number of degrees turned during each change in orientation is assigned the term *degrees-per-turn*. An imaginary line running through the centre of the fly from posterior to anterior, or *posterior reference bearing*, was used as a reference for the visual field and blind sector measurements. The *visual field* is the three-dimensional extent of a fly's vision, the inverse of which is the *blind sector* (i.e. the three-dimensional extent over which a fly cannot see). *Threshold* refers to the angular limits of the visual fields and blind sectors and describes the points at which vision is or is not possible. For practical reasons described in the text, measurement of the visual fields and blind sectors was limited to the horizontal and vertical planes. The *horizontal plane* bisects the fly laterally along the posterior reference bearing. The *vertical plane* is perpendicular to the horizontal plane bisecting the fly dorsally/ventrally along the posterior reference bearing. Figure 1 gives a graphical description.

Study Area

The study was undertaken in Delapre Woods (SP755582), which is a 15ha mixed woodland located on the southern boundary of Northampton (VC32). The wood contains oak (*Quercus* sp.), sweet chestnut (*Castanea sativa*), sycamore (*Acer pseudoplatanus*), beech (*Fagus* sp.) and various conifers, together with significant amounts of standing and fallen deadwood.

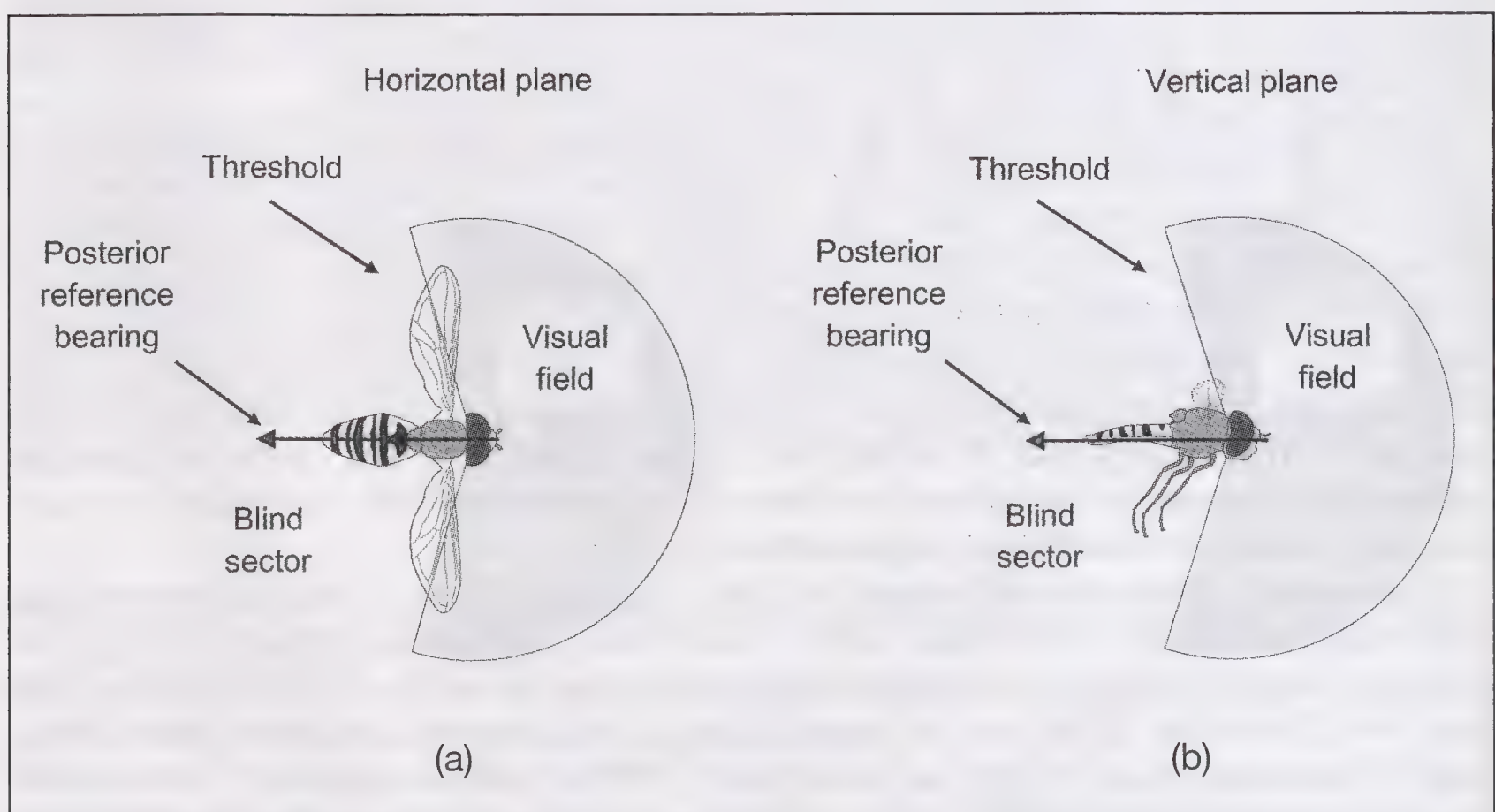


Fig. 1. Graphical description of the terms used in the text, as applied to (a) the horizontal plane, which runs parallel to the ground and (b) the vertical plane, which runs perpendicular to the ground.

Data Collection

Visual Field/Blind Sector Thresholds

Preliminary investigations revealed that *E. balteatus* reacted to movement from all directions, except from a blind sector projecting directly behind the insect. Trying to conduct measurements over the full 360 degrees would be difficult to accomplish with any degree of accuracy. To make the most of the field trips, it was therefore decided to limit activities to determining the visual field and blind sector thresholds in the horizontal and vertical planes, measuring their deviation from the posterior reference bearing.

The measurements involved the use of a movement simulator, which incorporated a rotatable rectangular piece of cardboard as a model of an *E. balteatus*. The design and operation of the simulator is described in Alderman (2012). During initial observations it was noticed that even a small movement made by the observer or another flying insect when close to a swarm would cause individuals in that swarm to react with a small movement upwards and away from the source of the disturbance. This behavioural characteristic, here referred to as the reaction response, was used as a signal that an observed *E. balteatus* had reacted to the simulator.

Preliminary investigations revealed that there was no reaction up to approximately 15 degrees in the vertical and horizontal planes, either side of the posterior reference bearing. Making use of this information, the occurrence or otherwise of a reaction response was recorded at each visited swarm by operating the simulator at a position between 10 to 60 degrees either side of, and between 5 to 30 degrees up and down from, the posterior reference bearing of a hovering individual and noting any reaction and the deviation from the posterior reference bearing. The simulator was operated approximately 2.5 metres from the selected individual, a distance which was guaranteed to cause a reaction if within its visual field whilst avoiding the presence of the operator influencing the reaction. The operation itself comprised one rotation of the model 180 degrees clockwise followed by another rotation 180 degrees anti-clockwise, such that the model was visible from the swarm as two flashes. Due to a conditioning effect, whereby repeated operations of the simulator were ignored (Alderman, 2012), the target was operated once only at each swarm visit. In this manner, 27 swarms were visited on the 27th July 2011 to measure the horizontal plane responses and 32 swarms visited on the 1st August 2011 to measure the vertical plane responses.

Degrees-per-Turn

The degrees-per-turn data were collected by standing 2 to 3 metres from a swarm, focussing on one hovering individual and recording the number of degrees turned during each change in orientation. This involved the use of a large scale protractor, constructed as described in Alderman (2010b). In this manner, a total of 21 swarms were visited on the 19th August 2011, taking between 5 to 13 measurements at each swarm. The results gave the median degrees-per-turn for each swarm, which in turn gave an overall median degrees-per-turn for this study.

RESULTS

Visual Field/Blind Sector Thresholds

For 17 of the 27 swarms visited for the horizontal plane measurements, the model elicited a reaction response when between 15 to 60 degrees either side of the posterior reference bearing. For the remaining 10 swarms, there was no reaction response

when the model was within 10 to 25 degrees either side of the posterior reference bearing.

Of the 32 swarms visited for the vertical plane measurements, the model elicited a reaction response when between 15 to 25 degrees above (7 swarms) and 20 to 30 degrees below (11 swarms) the posterior reference bearing. There was no reaction response when the model was between 5 to 25 degrees above (3 swarms) and between 10 to 30 degrees below (11 swarms) the posterior reference bearing.

Degrees-per-Turn

The degrees-per-turn data from the 21 swarms visited revealed that individual swarming *E. balteatus* turned between 20 to 40 degrees during each orientation change, giving an overall median 25 degrees-per-turn.

DISCUSSION

The preliminary investigations revealed that the visual field of male *E. balteatus* extended around the anterior of the insect, with the blind sector extending around the posterior. The visual field and blind sector results themselves gave overlapping thresholds, which was as expected and presumably being due to individual variations. The horizontal plane visual field/blind sector thresholds overlapped from 15 to 25 degrees either side of the posterior reference bearing. Taking the mid-point of the overlap as the threshold, gave a horizontal visual field of $360 - (2 \times 20) = 320$ degrees (Fig. 2a). The vertical plane visual field/blind sector thresholds overlapped from 15 to 25 degrees above the posterior reference bearing, giving a dorsal mid-point of 20 degrees, and overlapped 20 to 30 degrees below, giving a ventral mid-point of 25 degrees. This resulted in a vertical visual field of $360 - (20 + 25) = 315$ degrees (Fig. 2b). Note that the horizontal visual field was symmetrical, but the vertical visual field was $180 - 20 = 160$ degrees on the dorsal side and $180 - 25 = 155$ degrees on the ventral side. The asymmetry in the vertical field was presumably due to the lower thorax and legs obscuring the ventral view. These results compare well with the 280 to 300 degrees horizontal visual field for the hoverfly *Syrirta pipiens* (L.)

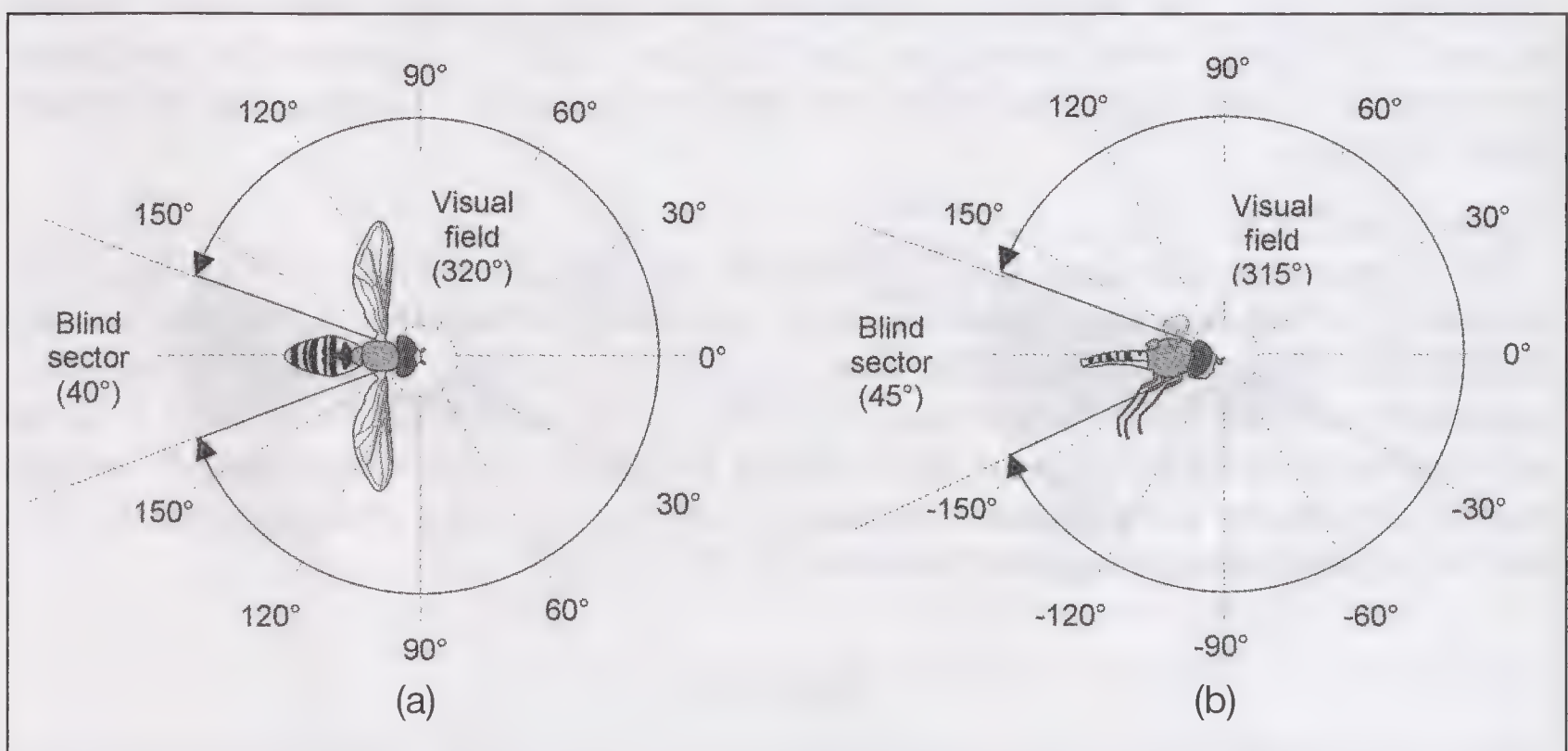


Fig. 2. The visual fields and blind sectors of swarming male *Episyrphus balteatus* in (a) the horizontal plane and (b) the vertical plane, based on the mid points of the overlapping thresholds as described in the text. The solid line bordering the visual field represents the extent of *E. balteatus* detection range of 344mm (Alderman, 2012)).

suggested by Collet & Land (1975), which was the only published study giving the visual field of hoverflies found by the author. Even then, Collet & Land's results were determined by laboratory-based measurements (of the pseudopupils) rather than a behavioural study.

For practical reasons, the threshold measurements were made for the two-dimensional horizontal and vertical planes, whereas a fly's actual visual field is three-dimensional. On the assumption that the male *E. balteatus* detection range is equidistant in all the directions in which it can see, its visual field therefore comprises a sphere minus the spherical blind sector projecting from the posterior. Taking this into account, the probability of a hovering male *E. balteatus* detecting another insect at the extent of its detection range, which is flying directly towards it from any direction, is approximately 0.97. It follows therefore that the probability of not detecting an approaching insect approximates to 0.03. With such a wide visual field and resultant detection probability, individual members in an *E. balteatus* swarm should be able to detect the majority of approaching flying insects.

A further dimension to the detection of approaching flying insects by swarming Diptera is their habit of undertaking regular changes in orientation and position, which is assumed to be a method of increasing their effective visual field (cf. Sullivan, 1981). Swarming *E. balteatus* have been observed to change orientation once every 2.9 seconds (Alderman, 2010a); the results of this study revealed a median orientation change of 25 degrees. With a horizontal blind sector angle of 40 degrees (Fig. 2a), this suggests that an individual swarming *E. balteatus* scans a complete 360 degrees on average every 5-6 seconds. Given the very high probability of detecting an approaching insect without changing orientation, it was thought unlikely that changes in orientation would themselves further increase this probability.

Nevertheless, *E. balteatus* swarms do periodically change orientation (Alderman, 2010a). Many insects possess a region of high visual acuity in the dorsal region of their compound eyes, commonly known as the dorsal fovea, which has been associated with target detection. Examples include the hoverfly *S. pipiens* (Collet & Land, 1975), the blowfly *Sarcophaga bullata* (Parker) (Gilbert & Strausfeld, 1991), the dragonfly *Libellula quadrimaculata* (L.) (Sauseng, Pabst & Kral, 2003) and the hoverfly *Eristalis tenax* (L.) (Nordström & O'Carroll, 2006). In this study, the target was never chased during the simulation tests that resulted in a reaction, but an earlier study reported that all approaching insects that caused a reaction were chased (Alderman, 2012). It may therefore be the case that male *E. balteatus* also possess a dorsal fovea and that a moving target has to be seen by this region in order to trigger a chase. If this is so, then changing orientation would increase the chance of an approaching flying insect being within the visual field of the dorsal fovea, which would in turn enable a chase to take place without undertaking a reaction response beforehand.

The reaction to the target and an approaching flying insect was here recorded as a movement up and away from the source of the disturbance (see also Alderman, 2012). It was not clear whether this movement sequence also involved turning to face the source. It is also not clear whether male *E. balteatus* actually possess a dorsal fovea. This lack of data indicates the directions required to further investigate the suggested association between reaction response, visual field and acuity and changes in orientation.

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SHORT COMMUNICATION

***Prochoreutis myllerana* (Fabr.) (Choreutidae) and *Idaea muricata* (Hufnagel) (Geometridae) in North Hampshire.** – On the 8.ix.2011, at Eelmoor Marsh, Farnborough (SU8353), we observed adult *Prochoreutis* in great profusion on skullcap *Scutellaria galericulata* growing in a steep sided ditch where it avoided being heavily grazed by the resident Przewalski's horses and cattle. The four specimens collected (3 male and 1 female were all *Prochoreutis myllerana* (Fabr.) (Choreutidae) (Plate 7, Fig. 2): these appear to be the second record of this species in VC12, the previous from Leckford Estate, on 16 August 1986 (J. R. Langmaid and D. H. Sterling) was not included in Goater & Norriss 2000, *Moths of Hampshire and the Isle of Wight*. Pisces. (Mike Wall, pers. comm.). The book states that there are no modern records of *Idaea muricata* (Purple-bordered Gold) from North Hampshire, despite it being formerly frequent in the Farnborough area in the 1950s. It is interesting to note that we found and photographed an adult of this species in a mire area at Eelmoor, among abundant bog myrtle *Myrica gale* on 25 June 2011 (Plate 7, Fig. 3). – JONTY DENTON, 31 Thorn Lane, Four Marks, Hants GU34 5BX & SCOTTY DODD, 14 Scott Close, Stoborough Green, Wareham, Dorset BH20 5BZ.

A LEPIDOPTERIST REMEMBERS

KARL BAILEY

McNaughton, 9 Back Lane, Tingewick, Bucks MK18 4RL

For long referred to as Industrial Melanism, it was in 1896 that our late president J. W. Tutt first suggested that the spectacular increase of the melanic morph *carbonaria* of the peppered moth *Biston betularia* (L.) might be an example of Darwinian natural selection in action secondary to bird predation depending on resting site crypsis of the adult moths (Tutt, 1896). It was not until 1953 that H. Bernard D. Kettlewell began a series of field experiments to demonstrate to the world that natural selection was indeed a fact using the *betularia* morphs as a model (Kettlewell, 1955). Judith Hooper's (2002) 'of Moths and Men' describes how Kettlewell, a lepidopterist of great ability, was recruited by E. B. (Henry) Ford to join the Oxford School of Ecological Genetics so that these experiments might be accomplished. With much biographic material relating to themselves, other individuals from the academic world and elsewhere and with its final aftermath, I found this book very interesting not least because much of it was centred around Oxford and my home was in that city.

My father was a medical G.P. in Oxford and he had a practice including patients from the surrounding countryside, and so as a child in WW2, I had easy access by car into the countryside. My father was interested in general natural history, most things mechanical and although not a collector he could set Lepidoptera quite well. As a young man, he had gone on a mindbroadening long sea voyage. He had bred canaries and had hybridised them with handreared chicks taken from wild finch nests. Well acquainted with Darwinism, he would refer to the 'Science of Life' by Wells, Huxley and Wells (1929) and being an agnostic he had a zero tolerance to any form of creationism. The only thing he would have cherished from this present age would have been digital photography.

One night in the blackout of WW2, an eyed hawk *Smerinthus ocellata* (L.) found its way into our house. My father set it and I, a seven year old, was shown it in the morning. A switch was thrown starting an obsession in me. From then on we started collecting in the then rich localities around Oxford. Soon all the necessary equipment was obtained from Watkins and Doncaster's and a visit to 36 The Strand was the best part of any trip to London.

Nobody got hysterical at the sight of a butterfly net in those days, there was a greater enemy just across the Channel to worry about.

My early attempts collecting moths met with little success. Apart from red underwings *Catocala nupta* (L.) on telegraph poles, searching fences, tree trunks and walls yielded little, so gradually I gave all my attention to butterflies. My father would take me occasionally to the Oxford University Museum. On entering, one was immediately regaled with the heady incense of preservatives. We would head for the Hope Department to be greeted by Ernie Taylor, the head technician. Ernie would answer our questions and I was able to peruse the collections with awe, even the beautifully maintained Dale collection. Whenever we went collecting, we kept a close lookout for aberrations but without much success. However, I was spurred on by 'Butterflies' by E. B. Ford (1945) given to me when I was ten. I was fascinated by the 'Merrifield Experiments' reported therein and what might be achieved.

Being an amateur lepidopterist, I was not a regular recipient of the publications reserved primarily for the academic world and professional biologists in particular. It came as a great surprise to me to read that after Kettlewell's death, his work with

B. betularia had come under much scrutiny and criticism. Unfortunately, this provided undeserved ammunition for the creationist movement.

It is of course the duty of any research worker to look for flaws in any established technique. Since reading E. B. Ford's 'Moths', I had never doubted the veracity of the conclusions stemming from Kettlewell's epic experiments. It seems that the greatest objections have arisen from the fact that Kettlewell liberated his premarked moths onto tree trunks in specified areas before they flew off in the forthcoming night to adopt their natural rest positions in the days ahead. The problem was that very few *B. betularia* had ever been found at rest on tree trunks. Indeed, the only *B. betularia* that I have ever found was close to the ground on some garden masonry. However, I was once witness to a common but very rarely ever observed event that convinces me that Kettlewell was closer to reality than his detractors would have us believe.

In the autumn of 1953 shortly after Kettlewell's first experiment in a bird reserve in Birmingham, I had entered the Dental School in that city as a student. With some exams looming in the spring of 1954, I had returned to my home in Oxford to do some revision work.

The house was a modest detached north-facing building on the south side of the main western approach into Oxford and already the road was showing signs of traffic gridlock. There was a front garden with a lawn surrounded by a tall privet hedge, once a locality for privet hawks *Sphinx ligustri* (L.), long departed due to traffic pollution. The lawn was bisected by an approach pathway. In the centre of each lawned area stood a purple *Prunus* tree, each with a trunk diameter of about 30cm. Around each tree was a concentric circle of bare, dark, soot-laden soil of about 2 metres in diameter. These would shortly be supplied with summer bedding plants. My upstairs room looked down on to this little garden and the busy road beyond.

Late one afternoon in early April, I had interrupted my studies and gone over to the leaded light window for a rest, gazing at nothing in particular outside. All at once, my attention was drawn to a small blob of grey cotton wool that was moving slowly and jerkily in a westerly direction across the earth of the far flower bed towards its central (and the more distant) *Prunus* tree. The total distance from my eye to the object would have been about 15 metres. I decided to investigate. On reaching the tree, I saw it was a newly-emerged moth with the wings still unexpanded and with its body still plump with haemolymph and meconium. It reached the more shady eastern side of the tree and began to ascend. It reached a height of about 60cm and then began to inflate its wings. It looked quite conspicuous against the smooth blackened trunk. It maintained the familiar wing-over-back position for about 40 minutes then changed to the typical clamped down pose. It was not a *B. betularia* but a close relative, the brindled beauty *Lycia hirtaria* (Clerck). I never did find the empty pupal case, but on subsequent days, collected several more freshly-emerged adults, all in the same position and at the same time of day on the shady side of this tree. With these moths' lack of crypsis and their movement, I remain convinced that they would have been easy prey for any ground-feeding bird. However, birds rarely visited this garden owing to the activities of our efficient family cat. I have often wondered what if that *hirtaria* had been replaced by a *carbonaria*, would I have ever noticed its movement against the dark soil?

Back in Birmingham, I put this recent experience to the test and found I could spot freshly-emerged lime hawks *Mimas tiliae* (L.) (low down on the eastern side of lime trees) from the top of a moving bus thereby gaining a certain reputation amongst my fellow students.

It seems that to witness a natural eclosion is a very rare event, even for lepidopterists, let alone academics and professional biologists and this vulnerable

phase in a moth's life may well have been overlooked or possibly ignored by researchers.

Apart from this moth, I have only witnessed two such events in my life, both with butterflies and curiously, both were on Caribbean islands.

Of course, I have been present many times at the eclosion of some long-awaited temperature-shock induced aberration and have been impressed by the strategies utilised to avoid detection as if in the wild.

If I were ever asked to do a repeat of Kettlewell's work, I would mark the moths appropriately and then keep them chilled but not frozen until the following afternoon when they would be about 24 hours old and with fully hardened wings. They would then be liberated close to the ground in herbage near or around trees where they could warm up and find natural posteclosion resting places close to their underground pupation sites, thus promoting some degree of movement. *Biston betularia* being a fairly robust moth would probably need something more sturdy than a grass blade to support it during the critical wing expansion phase thus some wandering may be inevitable.

In the course of selective breeding work, I have occasionally liberated quite large numbers of butterflies not required for further work. I have often noticed that those individuals that fly right away, those that rest on walls, etc., are never molested by birds, whereas those that settle on short turf are attacked mainly by blackbirds *Turdus merula*.

In my opinion, the period of greatest danger from groundfeeding birds and where efficient crypsis would have the greatest effect is in that brief period after eclosion and until the first flight when the known adult resting sites would be naturally chosen. Perhaps the valiant tree climbing exploits to find adult resting sites by some researchers may have been in vain (Majerus, 2002, 2003).

This idea may also help to explain some other puzzling phenomena such as west coast melanism and why the *carbonaria* morph had an apparent advantage in some non-industrial areas like East Anglia.

If nothing else, perhaps, with the untiring efforts that Bernard Kettlewell expended on his epic experiments, they will receive the proper recognition that they deserve.

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SHORT COMMUNICATION

***Deraeocoris olivaceus* (Fabr.) (Hem.: Miridae) new to Oxfordshire.** – This species was categorised as Notable B by Kirby (1992) and was first found in Britain by Mr W. A. Sands beating hawthorn (*Crataegus* spp., Rosaceae) and old apple trees (*Malus* spp., Rosaceae) in a derelict orchard at Sunninghill, Berkshire in July 1951

(Sands, 1954). More county records quickly followed, largely due to the work of the late and great Gerald Ernest Woodroffe, at Hounslow Heath in Middlesex, Burnham Beeches and Slough in Buckinghamshire, Bookham Common and Witley Common in Surrey, Windsor Forest in Berkshire, and Alton in North Hampshire (Woodroffe, 1954a, 1954b, 1956a, 1956b, 1959, 1963; Allen, 1958). All these records were on hawthorn. In the subsequent decades, more counties were gradually added to the bug's known distribution: South Essex; East Sussex; West Kent; West Sussex; Bedfordshire; and Hertfordshire (Tomlinson, 1971; Porter, 1985; Allen, 1993; Alexander, 2001; Brooke, 2002).

On 3 July 2006, I took a single specimen of the insect at Beacon Hill, Aston Rowant National Nature Reserve, a downland site in the Oxfordshire Chilterns (OS grid reference SU728968) (Plate 7, Fig. 4). At the time, I thought this unlikely to be a new county record, given the extensive recording of the bug in south-east England. In fact, Oxfordshire was somehow missed, and the county recorder Mr John Campbell has confirmed the bug as new to the county list. In the following year, on 9 July 2007, I found another specimen of the bug at Hitchcopse Pit (Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust Reserve), south-west of Oxford, in Watsonian Berkshire (SU452996), which I believe is the most westerly record so far published, being about 10km west of a record for Itchen Stoke, North Hampshire (Denton, 2001). – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: *RobRyanBugs@yahoo.co.uk*).

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COUNCIL AND OFFICERS' REPORTS FOR 2011

COUNCIL'S REPORT

At the end of 2011 the Society's total membership stood at 832 compared with 819 at the end of 2010. It is good to be able to report an increase in membership after a number of years when the membership has been falling. This is in no small part due to our 'membership team' of David Young, Roger Hawkins and Andrew Halstead for their efforts in recruiting new members and ensuring we remain in contact with existing members. We have 41 Life, 719 Ordinary, 13 Corporate, 1 Student, 12 Honorary and 46 Special Life Members. Forty-one members joined in 2011, five resigned and thirteen were struck-off for non-payment of subscriptions. Alas the deaths of eight members were reported to us in 2011. All these deaths are a loss to the Society but we should especially mark the passing of the four Special Life Members, R.M. Payne who had been a member for over 70 years, and S. Torstenius, P.E.L. Viette and A.S. Wheeler who had been members for over 60 years. Stig Torstenius and Pierre Viette were also part of our small band of foreign members. It is good that such loyalty to the Society continues and at the end of 2011 five members, T.K. Browne, Dr A. Eve, T.W. Harman, J. Roche and Miss C.M. Wagner completed 50 years continuous membership and were elected Special Life Members.

The Council met for its usual business seven times during the year, on six occasions in the South Place Ethical Society's Conway Hall and once in the Society's Pelham-Clinton Building where use was made of the new Howarths' Room. On average 15 members attended each meeting. Our President suffered a sudden and serious illness in October and was unable to fulfil his duties for the remainder of the year. His place was ably taken by one of the Vice-Presidents, Mr Mann. We are pleased to report that the President is now on his way to a complete recovery. An eighth Council meeting was held at the Pelham-Clinton Building in May. This special meeting was convened by the President to consider the Society's future. As well as Council members present and past, members of our affiliated societies and others interested in the Society were invited to attend. The topics discussed included how we might attract new members, and especially those now coming to entomology from other interests, how we can ensure that our communications keep up with new developments, how we might collaborate with other societies and whether our publications meet our members' needs. The meeting was well attended and many views were aired. A committee has been formed to consider the views put forward and how they might be acted on.

The highlight of the year was probably the long awaited publication of Colin Hart's *British Plume Moths* with 278 pages of text, black and white drawings of genitalia and colour photographs of adults and larvae. This is the first work on British plume moths for nearly sixty years and should become a standard and sought after text. The Council would like to thank Colin Hart and his collaborators for their achievement and the Publications Committee for overseeing the project to a successful conclusion. The last copies of *British Soldierflies and their Allies* were sold during the year and only a few copies of *British Hoverflies* remain. New editions of both books are planned but in the meantime there is a gap in our sales. Three other planned publications are having a much longer gestation period than we anticipated but, of course, all our authors are volunteers. The Council is aware that maintaining a stock of existing publications and fostering new ones is critical for the development of the Society. Of course, it is no good having publications without having someone to sell them and the Council is very grateful to Michael Darby who, as Sales Secretary, ensures a steady stream of income to the Society.

Work on the Pelham-Clinton Building has continued to take much of the Council's attention. The new air conditioning system was installed on schedule at the beginning of the year and has suffered a number of teething problems including manufacturing faults which could not have been foreseen by our installers and maintenance engineers. The system has now largely settled down and is providing a satisfactory environment for both the library and collections rooms. For reasons of cost and use it has not been extended to the Howarths Room. The Howarths Room was used for the first time in February to host Coleopterists' Day when, in between the talks, attendees were able to admire the redecorated room and comfortable new chairs. A new exterior fire escape door was fitted at the end of the year by Loddon Doors but work on the new doorway between the Howarths Room and the Library has had to be postponed until next year. However, we are confident, that by the time this is read, the new doorway will be installed. There is still some electrical work to be completed. The great part of the burden of finding contractors, obtaining estimates and supervising the work has fallen on our Building Manager, Martin Albertini, who could not have foreseen this when he took on the post. We are indebted to him for his enthusiasm in getting the work done. He has also been involved in the physical work of decorating, moving furniture and emptying cupboards and has been assisted with this by Darren Mann and Ian Sims. We thank them for this. The Council hopes to welcome members to an official opening of the Howarths Room in the spring of 2012 when it is hoped that Graham Howarth will be able to attend.

The Society's programme of regional meetings continued to prove popular with the meeting at Brogdale Farm, Faversham in Kent attended by 64 people and the meeting at the Tullie House Museum, Carlisle in Cumbria had over 30 people attending on the first day and had some different people for the field meeting on the second day. The Society's Annual Meeting was again held at Oxford University's Museum of Natural History. We must thank Hannah Cooke, Steve Hewitt and Darren Mann for organising these meetings and the Kent and Medway Biological Records Centre, the Tullie House Museum and Art Gallery, and the Oxford University Museum of Natural History for allowing us the use of their premises. A record number of 42 came to Coleopterists' Day held in the Society's rooms at Dinton Pastures. Nine workshops were held during the year and covered various aspects of the Myriapoda, Isopoda, Diptera, Hymenoptera and Hemiptera. The workshops cater for a range of expertise from the beginner to the specialist. Seven of the workshops were held at Dinton Pastures and two were held at the Angela Marmont Centre at the Natural History Museum. A total of 122 participants booked for these workshops. The Pelham-Clinton Building was open on sixteen Sundays during the year for members and visitors to access the collections and library. Our thanks are due to Ian McLean for organising the regional meetings and workshops and to Peter Chandler for opening our building when required. Dr McLean has asked to step down from organising the regional meetings and his place will be taken by Claudia Watts. The Annual Exhibition and Dinner remains the principal event on the Society's calendar. Attendance at the exhibition was 210, an increase of 26 on the previous year with 173 members and 37 visitors signing the attendance book. It is disappointing, therefore, that the number of exhibits was again fewer than previously. The Council thanks Jon Cole for taking on the role of exhibition photographer this year and we look forward to seeing his pictures in the *Journal*. The sit-down buffet style dinner at the Strathmore Hotel that had been tried for the first time in 2010 was repeated as the 2010 dinner had been favourably received. Thirty-six people sat down to another successful meal. Two notable absentees were our convalescing President and his wife. It has been suggested that it would be more



PLATE 5. Fig. 1. *Lepidosaphes chinensis* colony on the stem of *Dracaena sanderiana* © Maurice Jansen. Fig. 2. Group of *Lepidosaphes chinensis* teneral adult females on *Dracaena sanderiana* © Maurice Jansen. Fig. 3. *Lepidosaphes chinensis* mature adult female scale cover (bottom, cover length 3.0mm) and male scale cover (top, cover length 1.4mm) on *Yucca* © Fera. Fig. 4. *Lepidosaphes chinensis* female scale cover turned over to show the white eggs © Fera. Fig. 5. *Lepidosaphes chinensis* first instar scale cover © Fera. Fig. 6. *Lepidosaphes chinensis* second instar scale cover © Fera.



PLATE 6. Fig 1. *Dryodurgades antoniae* (5mm), Wanstead Flats, south Essex, 12.ix.2010. © T. Bantock. Fig. 2. Close-up of *Dryodurgades antoniae* showing facial patterning. © T. Bantock. Fig. 3. *Paracolopha morrisoni* wingless adult (1.6mm) on the roots of *Phyllostachys aurea*. © Fera. Fig. 4. *Paracolopha morrisoni* wingless adult showing the wax filaments excreted by the dorsal wax-gland plates. © Fera.

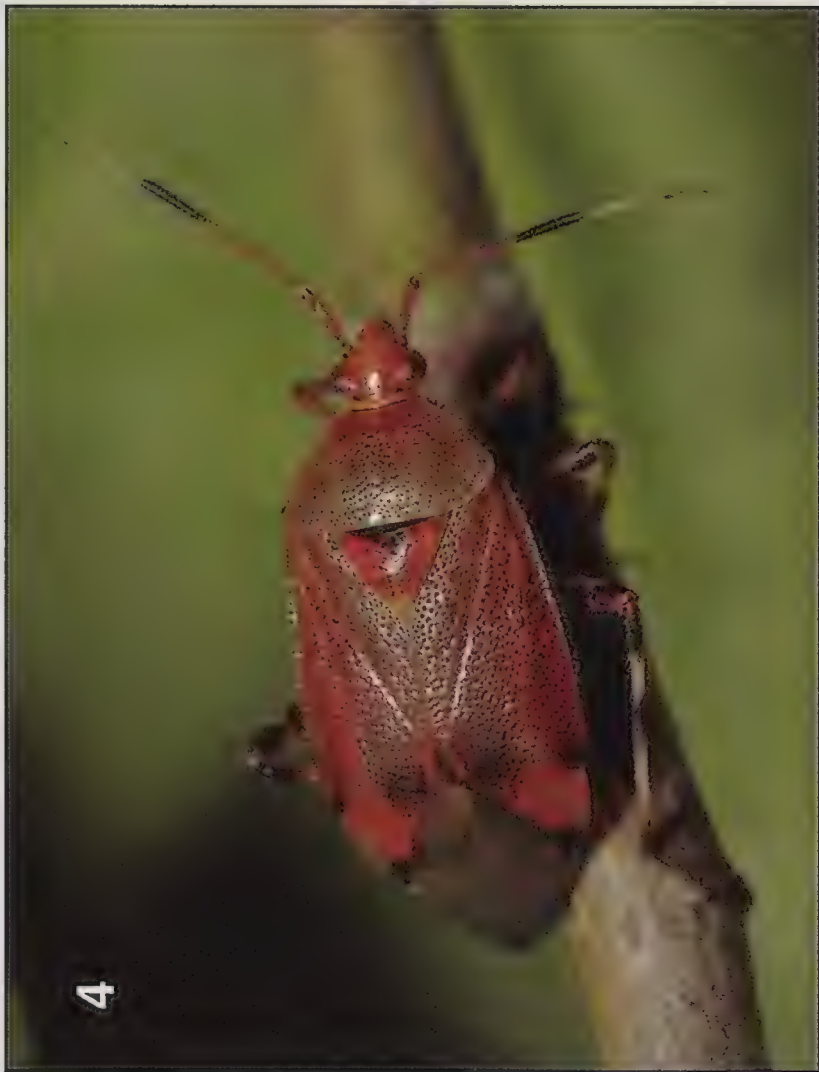


PLATE 7. Fig. 1. *Canthophorus impressus* (6mm), Great Cheverell Down, Wiltshire, 26 iii.2011. Photo: S. Covey. Fig. 2. *Prochoreutis myllerana* (wingspan 10mm), Dorset, 29.vii.2008. Photo: C. Manley. Fig. 3. *Idaea muricata* (wingspan 19mm), Eelmoor, Hampshire, 25.vi.2011. Photo: J. Denton & S. Dodd. Fig. 4. *Deraeocoris olivaceus* (9.5mm), Surrey, vi.2009. Photo: T. Bantock.



PLATE 8. Fig. 1. *Deraeocoris scutellaris* (7mm), Surrey, vi.2009. © T. Bantock. Fig. 2. *Aradus cinnamomeus* (4mm), Surrey, ix.2011. © T. Bantock. Fig. 3. *Miridius quadrivirgatus* (10mm), north London, vii.2008. © T. Bantock. Fig. 4. *Leptura aurulenta* (15mm), Hampshire, 1.v.2011. © T. Bantock.



Fig. 1. Honorary Secretary, Dr John Muggleton, admiring the wine decanter (suitably inscribed with the Society’s logo) presented to him on his retirement by the President Tony Pickles.



Fig. 2. Members at the Oxford AGM signing the Society’s Obligations book. David Holland (signing), Glenda Orledge, Judy Webb, Lawrence Brown (hidden from view), Erica McAlister, Claudia Watts, Mellissa Banthorpe, Andy Banthorpe, John Flynn, Dave Brotheridge and Chris Haines (far left).

convenient for members travelling some distance if the Dinner could start earlier and, therefore, in 2012 it will start at 6pm instead of 6:30pm. Mike Simmons once again orchestrated both events, as he has done so since 1991, but understandably he thinks it time to retire as Exhibition Secretary. The Council is very grateful to him for the way he has managed both events for the last 20 years; a job not always made easier by the actions of our host. Paul Waring prepared a programme of 34 field meetings for 2011, starting on 2nd April and ending on 16th October. There was a good geographical spread with meetings as far apart as Aberdeenshire and Somerset and even an invitation to take part in an event in the Burren in Co. Clare in Ireland. Scotland was particularly well served with meetings during the year.

Finally the writer may perhaps be allowed to end on a personal note. Although nominally this is the report of the whole Council, it falls upon the Hon. Secretary to write these words with input from his or her colleagues on the Council. This is the twenty-second time I have written the report, the first time being in 1986. It has been a great privilege to serve as the Hon. Secretary and especially at a time of change when the Society has grown both in numbers and activities and has acquired permanent premises. However, twenty-two years, albeit in two terms, is far too long for anyone to hold such a post. It is time for a change, for new ideas and new energy, and so I am resigning with effect from today. My one regret is that I leave with no successor in sight. I know it is increasingly difficult for societies such as ours to find volunteers to keep the Society running, but surely there must be someone amongst more than 800 members who could take on this essential role. There are other long serving Officers who, I suspect, will be difficult to replace; the Society needs to address this challenge.

JOHN MUGGLETON

TREASURER'S REPORT 2011 FINANCIAL YEAR TO 31 DECEMBER 2011

The Society has produced a surplus of £19,543 due mainly to a substantial donation of £40,000 from our late member Andy Callow. This donation also enabled the Society to avoid converting any of its investments to cash. Investment income has remained at the same level as in 2010 but the market value of our investments has fallen.

Capital expenditure consisted mainly of the purchase of a new air conditioning system and furniture for the Graham and Helen Howarth Room at Dinton Pastures, amounting to approximately £23,000. The cost of the air conditioning system was higher than anticipated as a more efficient and effective system was chosen.

Good sales of the new 'Plume Moths of the British Isles' towards the end of the year resulted in an increased contribution from our Trading Account.

Overall expenditure has increased, with the purchase of library books, increases in the maintenance of Dinton Pastures and the cost of holding the annual exhibition.

I would like to thank Roger Hawkins for his continuing work with subscriptions and Tony Pickles for his advice in preparing the accounts.

Thanks also to Phil Porter and Alan Philips for the work they have done in auditing the accounts.

A full set of accounts will be lodged at Dinton Pastures or may be obtained on application to the Treasurer.

JOHN FLYNN

Statement of Financial Activities
for the year ended 31st December 2011

	Un- restricted Funds	Restricted Funds	Endowment Funds	Total Funds 31.12.11	Total Funds 31.12.10
<i>Incoming Resources</i>	£	£	£	£	£
Bequests and donations	40,100	—	—	40,100	13,878
Subscriptions	16,061	—	—	16,061	12,306
Investment Income	3,726	2,326	826	6,878	6,919
Trading Income	—	15,144	—	15,144	8,759
Sundry Income	1,255	—	—	1,255	2,436
<i>Total Incoming Resources</i>	61,142	17,470	826	79,438	44,298
<i>Resources Expended</i>					
<i>Direct Charitable Expenditure:</i>					
Cost of Journal & Distribution	14,340	—	—	14,340	16,245
Cost of facility at Dinton Pastures	—	9,701	—	9,701	5,287
Members Meetings & Services	14,836	—	—	14,836	8,784
Library & Curation	4,586	—	—	4,586	1,149
Grants	1,500	—	—	1,500	495
Depreciation	3,815	2,696	—	6,511	4,800
	39,077	12,398	—	51,475	36,760
<i>Other Expenditure</i>					
Management costs	1,930	—	—	1,930	2,434
Trading costs	4,875	—	—	4,875	2,288
	6,805	—	—	6,805	4,722
<i>Total Resources Expended</i>	45,882	12,398	—	58,280	41,482
<i>Net Resources before transfers</i>	15,260	5,072	826	21,157	2,816
<i>Net Incoming /Outgoing Resources</i>	15,260	5,072	826	21,157	2,816
Gains & Losses on Investment assets					
Realised	—	—	—	—	—
Unrealised	(873)	(547)	(194)	(1,614)	44,715
<i>Net movement in Funds</i>	14,387	4,525	632	19,543	47,531
Fund Balances brought forward at 1st January 2011	£88,900	£294,473	£27,393	£410,766	£363,235
<i>Fund Balances carried forward at 31st December 2011</i>	£103,287	£298,998	£28,025	£430,309	£410,766

Balance Sheet as at 31st December 2011

	2011	2011	2010	2010
<i>Fixed Assets</i>				
Tangible Assets		183,092		166,386
Investments		<u>219,134</u>		<u>220,748</u>
		402,226		387,134
<i>Current Assets</i>				
Stocks	10,617		5,984	
Debtors	7,287		8,665	
Cash at Bank and in hand	<u>14,018</u>		<u>11,608</u>	
	31,922		26,257	

Creditors: amounts falling due within one year

	<u>3,840</u>	<u>28,084</u>	<u>2,625</u>	<u>23,632</u>
<i>Net current assets</i>				
<i>Net assets</i>		<u>£430,310</u>		<u>£410,766</u>

Funds

Endowment Funds – Hering Fund		28,026		27,393
Restricted Funds – Housing Fund	203,309		213,929	
Special Publications Fund	91,809		76,666	
Dinton Pastures Fund	3,878	298,998	3,878	294,473
Unrestricted Funds:				
Maitland Emmet BENHS Research Fund	55,966		56,444	
General Fund	47,320	<u>103,286</u>	<u>32,456</u>	<u>88,900</u>
		<u>£430,310</u>		<u>£410,766</u>

Tangible fixed assets

	<i>Leasehold Property</i>	<i>Fixtures & Equipment</i>	<i>Total</i>
<i>Cost</i>	£	£	£
At 1 January 2011	188,736	72,444	261,180
Additions	–	23,218	23,218
Disposals	–	–	–
At 31 December 2011	<u>£188,736</u>	<u>£95,662</u>	<u>£284,398</u>
<i>Depreciation</i>			
At 1 January 2011	40,145	54,649	94,794
Charge for year	2,696	3,815	6,511
On disposals	–	–	–
At 31 December 2011	<u>£42,841</u>	<u>£58,464</u>	<u>£101,305</u>
<i>Net book values</i>			
At 31 December 2011	<u>£145,895</u>	<u>£37,197</u>	<u>£183,093</u>
At 31 December 2010	<u>£148,591</u>	<u>£17,795</u>	<u>£166,386</u>

Investments

	2011		2010	
	M.V.	Cost	M.V.	Cost
	£	£	£	£
Shell T & T	25,970	1,250	18,031	1,250
Unilever	26,335	248	21,726	248
M & G Charifund	63,870	20,238	72,175	20,238
Hendersons Bond	54,296	58,000	58,950	58,000
Architas Bond	44,162	38,500	49,866	38,500
	<u>£219,134</u>	<u>£118,236</u>	<u>£220,748</u>	<u>£118,236</u>

Unrealised gains/(losses) arising in the year are shown in the Statement of Financial Activities.

Funds

Analysis of net assets between funds

	<i>Tangible Fixed Assets</i>	<i>Investments</i>	<i>Net Current Assets</i>	<i>Total</i>
	£	£	£	£
<i>Endowment Funds:</i>				
Hering Fund	–	14,614	1,873	16,487
<i>Restricted Funds:</i>				
Housing Fund	145,895	114,126	14,625	274,646
Special Publications	–	40,899	5,241	46,140
Dinton Pastures Fund		2,069	265	2,334
<i>Unrestricted Funds:</i>				
Maitland Emmet BENHS Research Fund	–	30,111	3,859	33,970
General Fund	37,197	17,315	2,219	56,731
	<u>£183,092</u>	<u>£219,134</u>	<u>£28,083</u>	<u>£430,309</u>

These abbreviated accounts are extracted from the Trustees' Report and accounts, a full copy of which has been lodged at Dinton Pastures and is available to members upon application to the treasurer.

JOHN FLYNN

EDITOR'S REPORT

As usual, Volume 24 of the *British Journal of Entomology & Natural History* was published in four issues: in March, June, September and December. The September issue was printed and distributed a month earlier than normal, whereas the December issue was printed in December and was circulated to members early in the new year so that important Society information could be included. This meant there was a longer than average period between the autumn and winter issues being received by members. The ever increasing cost of postage (and it is set to rise again) means that we must make best use of our regular postings and ensure details of field meetings, indoor events and other news are printed and circulated on time. Thanks are due to Andrew Halstead who does a tremendous job packing approximately 900 envelopes to send out to us each quarter – a lot of work.

Volume 24 comprised 256 pages, equivalent to 64 pages per Part, considerably down on the previous year. This represented 26 entomological papers and 17 Short Communications in addition to the usual reports of the Annual Exhibition and Officers' summaries.

Sixteen field meeting reports were received and these were published primarily in the first two Parts of the year. This is to ensure that you receive accounts of field meetings relatively soon (i.e. in less than a year) after they have taken place. This ensures they remain topical. A large proportion of these were written by Roy McCormick on behalf of the Devon Moth Group and if we had not had these there would have been very little to publish. Roy has indicated that he is stepping down from this role (I will miss him) and so we need other members of the Society to come forward to lead field meetings around the UK. A joint meeting between your local natural history society and the British Entomological and Natural History Society is an easy and cost-effective solution I find.

Regional meetings of the Society are a new feature and two reports of these were published in the *Journal*: the meeting held at the University of Cambridge (17 April 2010) and the meeting at Brogdale, Faversham (19 February 2011). Both were extremely well attended (60+ delegates) and represent important occasions when you can meet fellow members.

The majority of published articles were again on Hemiptera (36%) and Hymenoptera (22%) with only four on Lepidoptera (11%), three on Diptera (8%) and one on Orthoptera. It is mysterious why we publish so few articles on Lepidoptera when there are more exhibitors and exhibits associated with this Order of insects than any other at our Annual Exhibitions. There is much to investigate and report; for example, apart from a handful of butterfly species, nobody knows how far most of our commoner moths can fly, or even where they prefer to lay their eggs based on field observations. For example much of the information given in caterpillar books refers to observations made more than a century ago when our countryside was structurally different and to studies where ovipositing adults were presented with a limited choice of foodplants under artificial conditions. There's plenty of room for pioneering research on how butterflies and moths behave under real natural conditions. Throw away your potted plants and potter in the field. I would love to publish observations of this type in the *Journal*. After all we can only publish what we receive. If anybody has any ideas on themes we might publish on, then please contact me – address on the inside front cover.

The most important taxonomic paper of the year was an account of 15 species of oribatid mite new to Britain written by Francis Monson. Mites are allowed honorary insect status in most entomological journals and ours is no exception. This research,

which listed all the main identification sources for studying European oribatids just illustrates how easy it can be to study less popular groups of invertebrates and make new observations.

The reports of the previous year's Annual Exhibition are traditionally published in Part 3 so that members receive their journal just in time to remind them to prepare exhibits for the forthcoming exhibition in November. Dr Joe Botting is thanked once again for preparing the plates for the 2010 exhibition. This year, a new photographer was sought and Jon Cole, from Wokingham, kindly agreed to be the official photographer at the 2011 annual exhibition: his services are much appreciated. I would also like to thank the individual recorders: Aaron Jones, Sean Clancy, Richard Dickson, Norman Hall, Peter Chandler, Roger Booth, Alan Stewart and David Baldock for compiling the exhibition reports

There were 15 book reviews and five obituaries: of Charles MacKecknie-Jarvis, Dr Derek Lott, Malcolm Simpson and Rafe Ely (2), all kindly written by members of the Society.

The Insect Conservation News section written by Buglife is in its second year of operation and has proved extremely useful in alerting us to the work carried out by insect conservation bodies in the UK. By far the biggest subject covered was the full length article on 'The impact of artificial light on invertebrates' (*BJENH* 24: 173-184). The review described the relatively recent introduction of artificial lighting in domestic and urban areas, a change that has really only happened on a big scale over the past century. We know from first hand experience that light, especially in the form of mv light, is very attractive to many nocturnal insects and yet we have no real measure of the impact of artificially lit areas on insect behaviour, abundance and species richness. We are all literally 'in the dark' on this issue. Hopefully this may have stimulated some members of the society into conducting their own local research. This is a subject we will undoubtedly return to.

Once again, I would like to thank David Young and Roger Hawkins for preparing the Index to the previous Volume, and Jolyon Alderman and Adrian Knowles for acting as proof readers.

I look forward to receiving more papers from members in 2012.

JOHN BADMIN

CURATOR'S REPORT

There has not been any further progress in the amalgamation of the Society's Microlepidoptera into a single collection that began in 2007. As previously reported this has been completed as far as the Scythrididae, and the Pterophoridae were also laid out in 2010. The Pyralidae and Tortricidae remain to be arranged. Work on this slowed due to the lack of any further empty drawers to use for the new layout. It should be possible to continue with this soon after temporary removal of specimens from some drawers to free space.

Towards this end Ian Sims completed the staging of Tortricidae and Pyralidae from the Messenger collection, and I thank Ian for his contribution. This has resulted in clearance of a 12 drawer cabinet, which is now available for sale to members. This cabinet is not in perfect condition and has shallow drawers that require repapering. Members interested in purchasing this cabinet should view it at the Society's building.

As mentioned in previous years there are still a large number of unnamed micro-moths, mostly in store boxes and identified to family level. Any assistance with these by specialists would be appreciated.

In the absence of volunteers to carry out the large task of repinning and labelling the Coleoptera and Hemiptera collections as set out in the report for 2008, sources of funding for this project have yet to be identified and any suggestions regarding this would be welcomed.

I am grateful to Ivan Perry for a further significant donation of Diptera to the Society's collection.

PETER CHANDLER

LIBRARIAN'S REPORT

As you will hear elsewhere in this year's reports, great changes are underway at the Pelham-Clinton building at present, with the acquisition of the public display area from Wokingham District Council during 2010. With this in view, plans for expansion are afoot for the library in the coming year. On two occasions the Library Committee met to discuss the details to enable these expansion plans to be realised. It was decided that we should dispose of the glazed mahogany bookcases and cupboards, and replace these with modern metal storage cupboards and additional shelving to enable expansion of our book and journal holdings. Consequently, and thanks to Martin Albertini, the sale of the bookcases was arranged earlier in the year and realised £1000. The road is now clear for us to acquire the new items of furniture during 2012, but that is for next year's report.

During 2011 we had several books repaired and/or restored by Riley Dunn & Wilson. These include: Volume 125 of the *Entomologist's Record & Journal of Variation*; Volumes 7 & 9 of *The Entomologist*; Buckler's *Monograph of British Aphids* (3 volumes); Butler's *Biology of British Hemiptera Homoptera* and Barrett's *Lepidoptera of the British Isles*, Vol. 5. In addition, we have had back numbers of the journal *Atropos* bound, and undertook a round of purchasing new titles (see elsewhere for details).

Unfortunately, the two old blue Library Loans Books which "went missing" towards the end of last year, and which I appealed for the return of in my last report, have not materialised. If any member has information as to their current whereabouts I would be grateful for this.

In conclusion, I would now like to thank Tony Pickles, David Young, Peter Chandler, Roger Hawkins and Darren Mann for donations of books and/or journals during the past year. Special mention must be made of Martin Albertini who, in addition to assisting with the cataloguing of donations and new acquisitions, transported duplicate books and journals to the Annual Exhibition for sale to members.

IAN SIMS

PRESIDENTIAL ADDRESS PART 1: REPORT

TONY PICKLES

2a Park Avenue, Lymington, Hampshire SO41 9GX

It has become usual for the first part of this address to touch on the parlous state of entomology today. From global warming and over population to the dire effects on research and the museum service of financial cuts resulting from failed political control, we can find plenty to be gloomy about. But there are also reasons to be cheerful.

I am not sure how the statistics stack up but my impression is that more and more people are taking an interest in insects. There are more television programmes which touch on insects, more popular books on the subject, more people joining recording schemes and taking part in internet discussion groups centred on insects than ever before. My grandchildren take part in minibeast projects at primary school and seem to have a greater knowledge of invertebrates than ever I did at their age.

It is easy to dismiss much of this as being very lowgrade entomology; popular TV programmes are too shallow, recording schemes are plagued with identification issues and only tell us what we already know, the discussion groups tell us that someone saw a Yellow Underwing in their garden. But from all this there must be some good. Surely this is fertile ground; many people have had their appetites whetted. Is this very different from the Victorian and Edwardian eras when from the large number of people amassing specimens like stamps and dismissed by Tutt as 'mere collectors' rose several who made significant scientific contributions.

Our Society, its affiliates, Dipterists Forum, the Bees, Wasps and Ants Recording Scheme and the British Myriapod and Isopod Group and our sister societies Buglife, the Royal Entomological Society and the Amateur Entomological Society are surely in the right place at the right time to provide stimulus to those who want to learn more about insects. The membership has always been our greatest asset. Many of us will have anecdotes about meeting someone in the field who suggested we come along to a Society meeting, or of attending the Exhibition for the first time and there being enthused by a specialist in this or that group of insects. These days within our membership are both amateur and professional entomologists with expertise across all insect orders who are willing, and often keen, to share this knowledge with newcomers. They include amateurs who are only amateur in the sense that they do not derive their living from entomology, they are equally as knowledgeable and skilled as any professional. They include professional entomologists spearheading research in universities and museums, both professionals and amateurs involved in conservation at national and county level and many involved in organising and operating recording schemes. There are many members who are authors of both popular and scientific works on insects. Our membership provides much of the information about insects which ends up on our TV screens. What an asset our membership is!

We have heard earlier of the efforts made this year to improve the facilities at Dinton Pastures and this is another valuable asset of the Society. We have accessible collections covering most orders, microscopes available for members' use, an entomological library and in house facilities for talks and workshops.

We have achieved a great deal in the past; publications we can be proud of, the facilities of which I have spoken and assistance rendered to many individuals and entomological projects. We have a long history, 140 years, in which we have

provided nurture and a forum for discussion. I recently congratulated five more members who had been with us for fifty years, one of whom said that he valued his Special Life Membership more than the university degree on which he had based his career. It would be nice to think that in the next part of our history we can invigorate a new generation of entomologists who will be as happy to be our members long into the future.

Last May the Society hosted a meeting at Dinton Pastures, the aim of which was to examine in some detail what the Society did, what it could do better and what it could do in the future. We sought to address the perceived ageing of our membership and ways in which we could be attractive to young entomologists just developing an interest in insects. We revisited the results of the questionnaire conducted during the Presidencies of Mike Wilson and Mark Telfer to see if we had acted on our members' wishes.

A number of points came out of that day on which we are working although it may be sometime before we can implement many of the ideas put forward. One major point with which we have made progress is that we should consider employing a paid assistant to aid the Secretary and to offer administrative services to other officers. We believe this will free up time from some repetitive tasks, and allow officers to expend energy on more rewarding activity. After exhaustive discussion in Council I personally am pleased that we are proceeding to do this, a break with tradition, but one I am sure that will help the Society cope with the speed of modern life. We are pursuing ways to co-operate more with other entomological organisations, to share our facilities more fully with recording schemes and other groups in the expectation that this will lead to more young people becoming members. We are looking at ways of enhancing our internet presence. We are actively directing our thinking towards the future of the Society, to broadening our appeal whilst maintaining the standard of excellence we strive for.

Turning from what might be achieved in the future to what has happened in the past, it is my sad duty to mention those of our members whose deaths have been announced during the last year.

Ronald M Payne, a Special Life Member, was the Society's second longest-serving member having joined in 1940. He had wide interests in both botany and entomology. He was initially interested in Coleoptera, and then studied Odonata and Orthoptera before concentrating on Diptera later in life. His interest in botany was a constant, however, and he was an acknowledged authority on grasses. From 1941 to just before his death in 2010 Ron contributed a prolific series of papers to both the entomological and botanical journals. He was a member of several local natural history societies and a fellow of the Royal Entomological Society and the Linnaean Society.

Last April we learned of the death of Stig Torstenius from Sweden. An obituary will shortly be published in our Journal, but Stig, who joined in 1948 and was a Special Life Member, will be particularly remembered for his gift of Scandinavian macro Lepidoptera. The Torstenius Collection, includes examples of nearly every Scandinavian species and forms the core of our European Lepidoptera collections.

Alan Sydney Wheeler was also a Lepidopterist and Special Life Member, having joined in 1945. He was a keen attendee of the Exhibition and of field meetings in his younger days and is pictured on a field meeting in Surrey in 1959 in the Journal for that year. Although he had not been very active in Society affairs recently, he has left a handsome legacy to us. The final figure is not yet known but his generosity will amount to several thousand pounds which will help us fund the plans we have for the future.

Dr. Pierre Viette died in April just before his ninetieth birthday and was also a Special Life Member. Pierre was for many years Head of the Lepidoptera Department at the Museum of Paris. His work focussed mainly on the primitive moth fauna of French Oceania, the Reunion Islands and especially Madagascar, where he discovered a large number of species new to science.

Dr. Derek Lott, a member since 1998, died in June after a long fight with cancer. He worked as manager of the Local Records Centre in Leicestershire. He will be remembered for all he did to further the study of Coleoptera and in particular for his work on the RES handbooks' advisory committee and in himself producing handbooks on Staphylinidae over the last few years whilst he was seriously ill. An obituary has been published in the Journal.

Peter Taylor, died in May last year. He was a fellow of the Royal Entomological Society and a member since 1998. His main interest was in butterflies and he was regularly seen at our exhibitions and at those of the AES.

Mrs Christine Ballinger became a member of the Society in 2008 and was interested in Lepidoptera and Odonata. She died in October 2010 but the Society only learned of her death last April.

Dr. Peter Hulme was interested in Lepidoptera, in particular of his native Scotland and had been a member since 1979. He was not often able to get to meetings or our Exhibition, because of the distances involved but enjoyed our Journal. We heard of his death in April last year also.

We have recently learned of the death of Gordon Trebilcock this January. He was a lepidopterist and member since 1981. He was perhaps best known for his work on the TV programme, 'Elusive Butterflies' which he presented and largely produced for ITV in the late 1970s. I am informed that he was particularly proud of an aberrant *Anthocharis cardamines* (Orange Tip) he took, with the orange wing tips replaced with pale lemon, form *aureoflavescens* Cockerell.

I would invite all present to stand in memory of our late members.

I have been involved with Council for many years so the amount of work that individual Council members undertake on an entirely voluntary basis did not come as a shock to me but nevertheless deserves mention. Everyone on Council, whether officer, ordinary member or co-opted, has contributed to the best of their abilities and this year an additional burden has resulted from my hospitalisation. For several months it was necessary to deputise for me, not only at Council but at events and meetings I might otherwise have attended. I would particularly like to thank Darren Mann, David Lonsdale and Ian McLean for their contributions in this way.

We have already spoken about the amount of work that has been done at Dinton Pastures. Much of this; liaising with contractors, opening the building at all hours and a myriad of organisational details has fallen on Martin Albertini's broad shoulders and special thanks are due to him. I am sure that when Martin agreed to become our Building's Manager he could not have envisaged the amount of disruption it would cause to his life. Turning out on Christmas day to deal with a faulty alarm was just a part of it. Thank you, Martin. Many others have been involved in getting The Howarth room up and running. There have been people decorating, moving shelves, emptying cupboards and generally pitching in to do whatever is necessary and I would like to thank not only the Council members who have given up their time to this, but those other members of the Society who have willingly helped. As an example, only, Ian Sims and Jon Cole have just given up several days to painting in the library and installing new shelves.

I would like to thank everyone on Council for their contribution, but this year we cannot move on without special thanks to Mike Simmons who is retiring from

flawlessly organising the Annual Exhibition for the last twenty years. Under Mike's guidance the Exhibition and Dinner always seem to glide smoothly on and it is sometimes difficult to appreciate the sustained effort that goes into achieving this. Mike devoted much time in recent years to researching alternative venues and then in arranging the change in the Dinner location. Thank you for your substantial contribution to the running of the Society.

We would finally like to give special thanks to John Muggleton. John took over as Hon. Secretary in 1985 and with the exception of a couple of years off to be President has been guiding the Society ever since. What a huge contribution to our Society and entomology as a whole. John has been our public face, always there to guide Council, to interact smoothly with members, the general public and other organisations, including Government departments. He may have occasionally ruffled feathers, but only when justified. John has remained always calm and knowledgeable, but not afraid to mix it when required. For almost a fifth of its existence John has been a major influence on the Society. Although John is retiring today, that influence will continue, I have no doubt. John, on behalf of the Society, thank you very much.

SHORT COMMUNICATION

A second British record of *Haplothrips hukkineni* Priesner (Thysanoptera: Phlaeothripidae). – The finding of *Dendrothrips saltator* Uzel, during the BENHS field meeting held at Faversham Creek, Kent, on 4 July 2010, only the second time the species had been collected in Britain, has previously been recorded here (Collins, 2010). Earlier that day, the author took a number of phlaeothripids, beaten from sea club-rush, *Bolboschoenus maritimus*, along the western edge of Faversham Creek near its innermost point. The first specimens to be slide-mounted and examined microscopically were identified as *Haplothrips juncorum* Bagnall (Badmin, 2011). However, as further specimens were slide-mounted and examined it became apparent that they were dividing into two distinct segregates. The second species has been identified as *H. hukkineni* Priesner, the identification being confirmed after comparison with specimens deposited at the Natural History Museum, London (NHM). In total, 8 adult specimens of *H. juncorum* (6♀, 2♂) and 10 of *H. hukkineni* (6♀, 4♂) were taken. A number of phlaeothripid larvae were also collected and these too could be divided into two, unequal, segregates, based on colouration (10 whitish-yellow putative *H. hukkineni* and 2 orange-red putative *H. juncorum*; in addition, 2 pupae I and one pupa II were collected, all with an obvious orange-red tint).

Haplothrips hukkineni had only been collected in Britain on one previous occasion; Guy Morison took 5♀ and 5♂ from sea club-rush on 18 September 1961 at Winchelsea, East Sussex. As at Faversham Creek, the thrips were collected along with *H. juncorum*, individuals of both species from Winchelsea being mounted on the same microscope slides.

The two species can be distinguished from each other using three characters. Firstly, the maxillary stylets of *H. juncorum* are considerably closer together, no more than one sixth the width of the head apart as opposed to one third or more in *H. hukkineni*, in which the maxillary bridge also occupies a more basal position within the head. Secondly, the tube (abdominal segment X) of *H. hukkineni* is distinctly shorter and generally more squat in appearance. Published keys have characterised this as the length/width ratio of *H. hukkineni* being less than 2.0, but this is not true for a small minority of specimens. The squat appearance is a function

of the fact that the length of the tube in *H. hukkineni* is always less than in *H. juncorum*, with no overlap between their ranges; although the lengths are very small, the difference is in practice easily observed without measurement in slide-mounted specimens. Tube length in *H. hukkineni* individuals examined here (including the Faversham Creek specimens, the Morison specimens, and other specimens held by the NHM) ranged between 98 μ m and 130 μ m ($n = 21$), those of *H. juncorum* between 140 μ m and 159 μ m ($n = 28$) (all measurements were taken using a Zeiss Axio Imager M1 microscope connected to a computer using Axiovision image analysis software). Finally, in *H. hukkineni* the apical part of the male aedeagus is bilobed, in *H. juncorum* it is lanceolate; see Mound *et al.* (1976) for illustrations.

In addition to the Morison specimens of *H. hukkineni*, the NHM collection also holds a single female specimen marked in pencil as “*H. ?hukkineni*”, collected by Richard Bagnall from *Phragmites* at Canvey Island, Essex, in September 1949. The maxillary stylets are only slightly more than one quarter of the width of the head apart (but in the slide preparation they have been squashed down into the mouth cone) and the length of the tube is 113 μ m, supporting the tentative identification. This specimen, allied to the Faversham Creek finding detailed here, suggests that *H. hukkineni* may be more widely distributed around the south east coast of England than hitherto suspected, its presence masked by the sympatric presence of the similar, but considerably more common *H. juncorum*. *Haplothrips hukkineni* is found in central and south eastern Europe, and the eastern Mediterranean region, but has also been recorded from Norway and Sweden (Kobro, 2011). Records are conspicuously absent from France, Belgium, The Netherlands and Denmark but its presence in some or all of those countries may now be suspected. Recorded hosts are *Bolboschoenus* (*Scirpus*), *Cyperus* (both Cyperaceae), *Juncus* (Juncaceae), *Oryza*, *Phragmites* (both Poaceae) and *Typha* (Typhaceae).

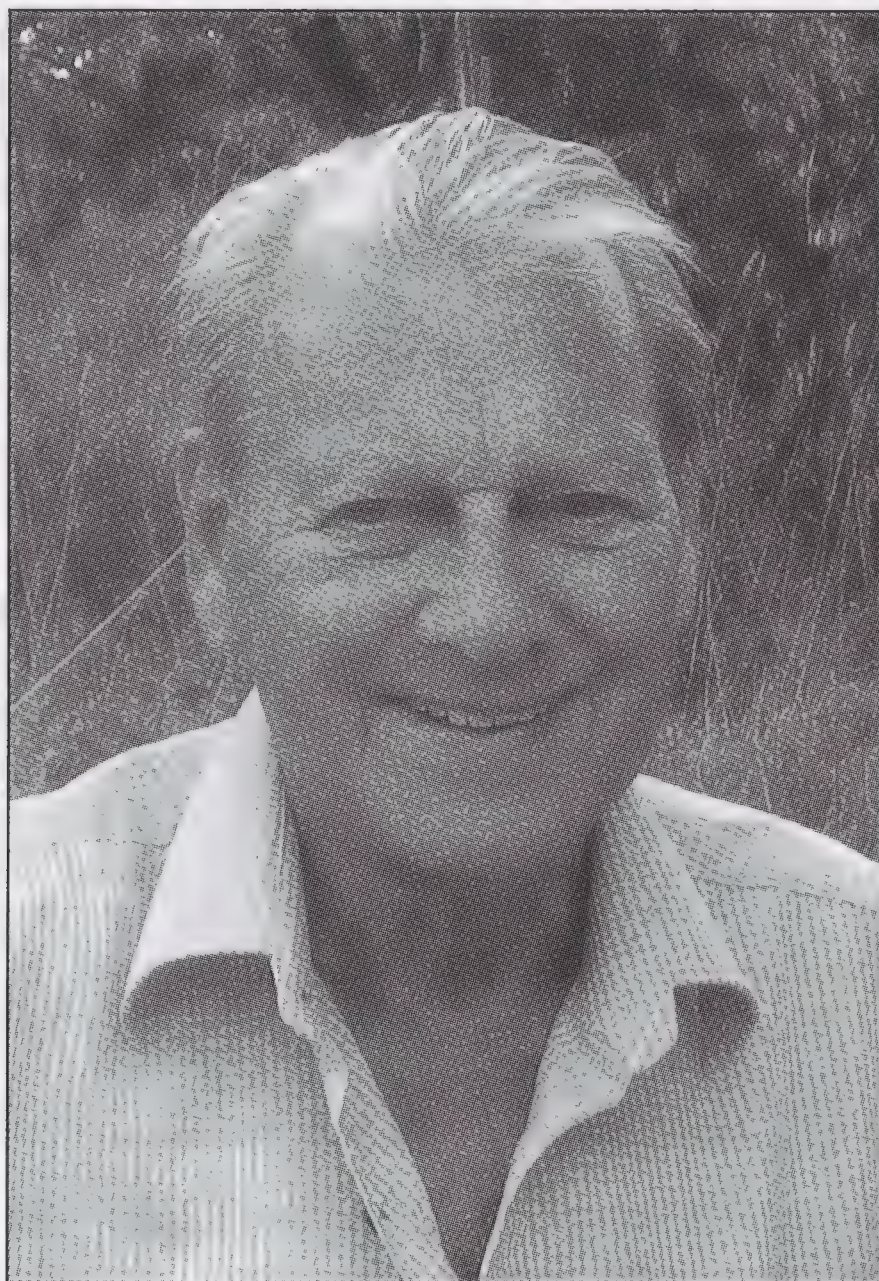
A third species of *Haplothrips* associated with wetland and other grasses in Britain is *H. aculeatus* (Fabr.). It is clearly differentiated from both the other species by having only one sense cone on antennal segment III (as opposed to two sense cones). The species is uncommon in Britain, recorded only from Cambridgeshire, Oxfordshire, Norfolk and Suffolk.

Once again I record my thanks to John Badmin who organised the BENHS field meeting at Faversham Creek. Dan Pye of The Food and Environment Research Agency (FERA) took the tube measurements. Voucher specimens have been deposited in the collections of FERA at Sand Hutton. – DOMINIQUE W. COLLINS, FERA, Sand Hutton, York, YO41 1LZ, dom.collins@fera.gsi.gov.uk

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OBITUARY



STIG TORSTENIUS
1924–2011

Stig Torstenius, a special life member of this Society, died on 1st March 2011 after a short illness at the age of 87. He is survived by his four children and their families to whom we extend our condolences. His wife, Margaret died a short time earlier.

Stig graduated as a lawyer in Uppsala and after a time spent in a number of legal firms joined the trust department of the Sundsvall Bank as Director. Most of the rest of his career was spent in the banking arena where he rose to head the legal department of the prestigious international bank, Nordea. After formal retirement he returned to a private law firm for a few years during which time he developed a key computer system for use within the field of family law.

Stig was an amateur entomologist specialising in the Macrolepidoptera of Scandinavia. As a twelve year old boy his interest in natural history crystallised on butterflies and moths and over the following formative years he was able to develop his knowledge and hone his field skills during the long summer breaks spent at his parents' summer cabin in Ljungsberg in Småland. His interest and enthusiasm never left him and when I had the pleasure of visiting him at home in Stockholm in 2004 he was keen to show me the several pheromone traps he had set in the neighbourhood and share the results. He was acknowledged, along with Ingmar Svensson who also died in 2011, as an older statesman of Swedish Lepidopterology, and he mentored and encouraged the next generation of Swedish lepidopterists.

During a period of service in London in 1948 he joined our Society and this led in 1980 through his friendship with the late Brad Ashby to his donating a collection to

us. This was augmented in 2004 with another substantial donation and the Torstenius collection of Scandinavian Macrolepidoptera housed at Dinton Pastures, now amounts to some 5,000 specimens. Virtually all the Scandinavian species and many of the forms and subspecies are represented. The bulk of his collection, a further 20,000 insects went to the Museum of Natural History in Stockholm.

He was a pioneer amongst collectors operating in recent times, in undertaking collecting trips to the far north of Sweden. In 1971 Stig named a new subspecies of *Orodemnias cervini* Fallou as *fridolini* (Lepidoptera, Arctiidae). This rare subspecies is confined to Swedish and Norwegian Lapland where it occurs high on mountains bordering the two countries. The taxa has since been reassigned as a subspecies of *Holoarctia puengeleri* (O. Bang-Haas, 1927) (Lepidoptera: Erebidae, subfamily Arctiinae)

In addition to his enduring interest in insects, Stig devoted much time during his later years to charitable societies with which he was involved. He was able to bring his logical legal brain to focus on several issues and derived much enjoyment from the creation of a register of members stretching back to 1840, the oldest such document in Sweden.

Stig will be remembered above all for his enthusiasm in all he did, his hospitality and his ready smile. I would like to thank his son, Björn Torstenius, for his help in compiling this tribute.

TONY PICKLES

ABBREVIATED BIBLIOGRAPHY

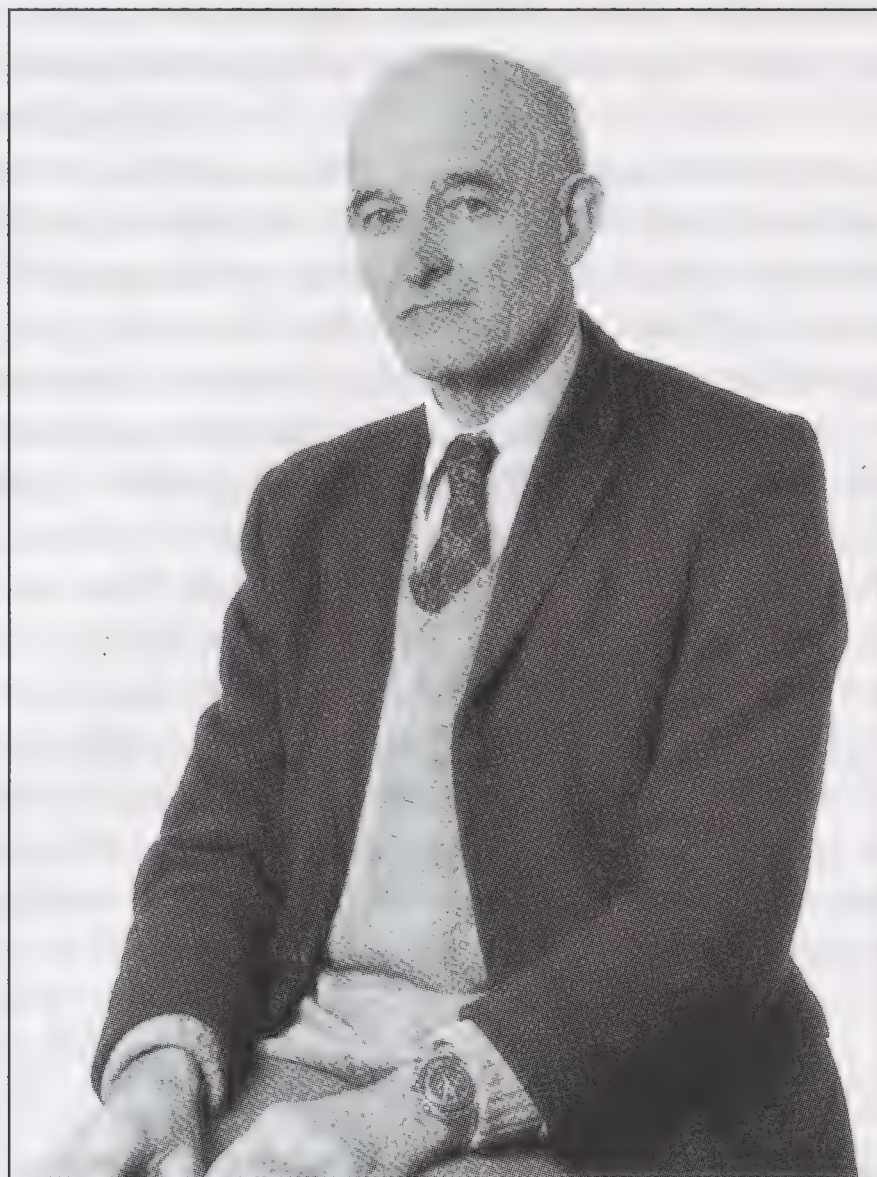
Stig contributed the following articles to the entomological press which may be of interest to English readers.

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SHORT COMMUNICATION

***Stathmopoda pedella* (L.) (Lepidoptera: Oecophoridae) in East Cornwall and Nottinghamshire.** – On 14 June 2005 I found adults of *S. pedella* on alders *Alnus glutinosa* at Criggan Moors, East Cornwall (SX0160); this represents a major extension of this local moth into the south-west. On 21 July 2011, I beat two adult *S. pedella* from alders growing beside the River Poulter in Elkesley, Nottinghamshire (SK6975), although found to the east in Lincolnshire, and to the north in the Sheffield area of South Yorkshire, these appear to be the first records for VC56. – J. S. DENTON, 31 Thorn Lane, Four Marks, Hants, GU34 5BX

OBITUARY



BERNARD VERDCOURT
1925–2011

Bernard Verdcourt, who died in Maidenhead on 25 October 2011, aged 86, was a botanist at the Royal Botanic Gardens, Kew. He made important contributions to two distinct fields of East African natural history: he was an acknowledged expert on African plants, and on non-marine molluscs. He was responsible for almost one-third of the monumental *Flora of Tropical East Africa* that deals with 12,500 species. At the same time his extensive researches on molluscs resulted in 'A revised List of the Non-marine Molluscs of East Africa' in 2006, a multitude of species descriptions, and around 380 malacological publications introducing over 200 new names. His malacological output was such that his colleagues found it difficult to believe it was the product of what time remained outside his career as a botanist.

He had always been very interested in insects and contributed over 200 notes and short papers to various entomological journals from the age of 19 onwards. He collected *Meligethes* beetles extensively in East Africa, obtaining numerous new species, also many new species of Neuroptera. Several were named after him including *Meligethes verdcourtii* (Col. Nitidulidae) which was described by A. M. Easton as 'dedicated to the finder who has collected so energetically . . .' Another new species described in the same paper was named *Meligethes lornae* in honour of his wife, Lorna, who often accompanied him on field excursions.

The grandson of a Belgian hatter, Bernard Verdcourt was born in Luton, Bedfordshire on 20 January 1925, and attended Luton Grammar School. Here his enthusiasm for botany was fostered by John Dony, county recorder for plants, while local hymenopterist, Victor Chambers, encouraged a lifelong interest in entomology.

In 1943 he was called up and trained as a radar operator at Reading University and subsequently graduated with a degree in Radio Engineering, Physics and

Chemistry from the University. He worked briefly as a mycologist and microscopist before, in 1948, joining the East African Agriculture and Forestry Research Association. Following a year's training at Kew, he moved to Amani in Tanganyika (now Tanzania) under the eminent botanist P. J. Greenway. Much to the regret of the scientific staff the institute was moved to Kenya in 1950. So only a year and a half after he had arrived he was much involved in moving the large Amani herbarium to its new home in Nairobi, where it became the main part of the East African Herbarium, now part of the National Museums of Kenya.

His regular work, spanning a 15 year period, of naming thousands and thousands of plant specimens for various government departments, visiting research workers and the general public led to him acquiring an unrivalled knowledge of the East African flora and its literature. He somehow managed to find time to conduct his own botanical research and gained an external PhD from Reading University in 1955.

After serving from 1958 to 1964 as Botanist-in-Charge of the East African Herbarium, he returned to England in 1964 and worked at Kew, first as Principal Research Fellow and latterly as a Principal Scientific Officer. Bernard officially retired in 1987 but this made little impact on his botanical research output. He continued working on the Flora of Tropical East Africa, Flora Zambesiaca and a Revised Flora of Ceylon. As a spritely 80 year old he was still working four days a week at Kew, publishing prolifically. It was during this period that he also published a number of short papers on insects found in the vicinity of Kew. With his malacologist's hat he added the snail *Perforatella rubiginosa* (Schmidt) to the British list and worked on the miniscule snails of the genus *Carychium* in Britain, with Hugh Watson.

He published more than 1,200 papers and books on botany, malacology and entomology, but said he had done scarcely anything of real merit – “just a mass of descriptive material, useful, requiring judgement and knowledge but scarcely any intelligence”. Others believed differently: he was elected President of the British Conchological Society in 1969, awarded the Kew Gold Medal in 1986, and honoured by the Linnean Society of London with their Gold Medal in 2000.

Bernard published extensively on the British insect and arachnid fauna showing an exceptional interest in almost any group he encountered. Many were published in the Entomologist's Monthly Magazine – typical of these were his discoveries of the leafhopper *Athysanus argentarius* Metcalf, the rare stiletto fly *Pandivirilia melaleuca* (Loew) and the berberis sawfly *Arge berberidis* Schrank at Maidenhead where he lived (Verdcourt, 1994, 2003, 2004). His best finds among the Diptera were perhaps the rare conopid *Leopoldius signatus* (Weidemann in Meigen) and the stratiomyid *Oxycera dives* Loew (Verdcourt, 1946, 1966). He was Neuroptera recorder of the Bedford Natural History Society for 58 years. Many will remember him for his long-running series on ‘Additions to the wild fauna and flora of the Royal Botanic Gardens, Kew’ that he took on after the death of Kenneth Airy Shaw in 1985.

Bernard joined the British Entomological and Natural History Society in 1993 and was a regular attendee at open days at Dinton Pastures, as his home was nearby. He regularly donated specimens to the collections and when he became ill in 2009 donated around 100 titles to the Society's library, plus copies of all his entomological publications and some of the papers containing his records and those of specimens he had collected for others. He published just one note in the Society's journal, appropriately for a taxonomist on the derivation of the species name for the recently introduced harlequin ladybird *Harmonia axyridis* (Pallas), which Pallas had discovered feeding on the chenopod *Axyris amaranthoides* L. (Verdcourt, 2007). In later years he was immeasurably saddened by the large extinction of insect life in Britain, the diversity of his childhood having disappeared.

Bernard is perhaps unique: I know of several entomologists who have published floras, but Bernard is the only professional botanist, who I am aware of, who in recent times has crossed the great divide and published taxonomic keys and numerous papers on animals.

Bernard was delighted to receive visitors at Kew and there was always an open house for coffee in his hidden corner of the Herbarium. He was not shy of controversy though and would often speak his mind on botanical matters. He was an inspiration to many younger colleagues who admired his knowledge and his incisiveness.

Bernard Verdcourt was twice married: first to Lorna Crompton, and secondly to Helen Dadd. He is survived by both wives and by a daughter of his first marriage.

With thanks to Roger Polhill, one of his fellow botanists at Kew, Martin Albertini and Trevor James for help in compiling this obituary.

JOHN BADMIN

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SHORT COMMUNICATIONS

***Deraeocoris scutellaris* (Fabr.) (Hem.: Miridae) in the Chiltern Hills.** – This elusive, black insect (Plate 8, Fig. 1) is traditionally associated with heathland, and many specimens have also been taken at light in non-heathland areas (Southwood, 1950). However, in a literature search covering the last 60 years of the national entomological journals, I have found another, less well publicised environment within which the bug has been found on several occasions: the chalk downs of south-eastern England. Here, where the details of capture have been stated, the bug has been taken singly by sweeping, with the exception of one record obtained beating hazel (*Corylus* spp., Betulaceae) (Southwood, 1950). All but two of these records relate to the North Downs, the bug being found at Bookham Common in Surrey (Southwood, 1950), Shoreham in West Kent (Morris, 1959), Trottiscliffe in West Kent (Side, 1962), Northward Hill in West Kent (Newcombe, 1978) and Coulsdon in Surrey (Nau, 2005). The other two records come from the Chiltern Hills: at Ipsden, Oxfordshire in the extreme south-west of the Chilterns (Woodroffe, 1960); and on the Dunstable Downs, Bedfordshire in the extreme north-east (Nau, 2005). Given the rarity of capture of this bug, the enigma as to its habits, and the paucity of records from the Chiltern Hills in particular, I thought that it may be of interest to present details of my own two encounters with the insect, both of which occurred in the Chilterns.

My first capture of the bug was a single female swept from a steep downland slope at Hartslock (Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust Reserve), near Goring, Oxfordshire on 28 June 2009 (OS grid ref SU618793). The circumstances seemed to be similar to those reported by Morris (1959). The bag of my sweep net was teeming with *Capsus ater* (L.) (Miridae), a bug similar in size and colour to *D. scutellaris*, amid which solitary specimens of the latter can easily be missed. Morris pointed out that *D. scutellaris* may be under-recorded in downland habitats due to its superficial similarity to the much commoner *C. ater*. I only spotted my specimen in the bag by noticing that the second antennal segments were not clubbed. Under the microscope, the differences between these two species are much more obvious.

My second encounter with the insect was unlike that of any of the other records I have found. I was searching for lacebugs (Tingidae) and groundbugs (Lygaeidae) in mosses on another steep downland hillside at Coombe Hill (National Trust), near Wendover, Buckinghamshire (SP847065) on 23 June 2010, using a car vacuum cleaner as a suction sampler (Ryan, 2011). As I worked my way from one patch of moss to another, a large, dark arthropod suddenly darted out from the moss in front of me and scurried at speed horizontally across my field of view. I often disturb spiders and beetles by this method of capture, but on this occasion the startled animal was clearly a bug. I gave chase with my appliance, reaching the beast at the point at which it sought sanctuary, submerging itself back into the moss. Initially, I thought that I had lost the insect, but on emptying the contents of the vacuum cleaner into my sweep net, the bug, a male, appeared and was captured. *Deraeocoris scutellaris* is not listed for Buckinghamshire in Masee (1955), and in my literature search I did not find any other record of the bug for this county. This capture may therefore be a new county record.

It is difficult to draw many conclusions from such limited data, other than to emphasise the importance of chalk downland habitats for this species. I should also echo the advice of Morris (1959) that when sweeping on downland, a close, careful examination of the catch may reveal a rare prize and a valuable record for this seldom encountered insect.

Some additional images of this species can be found on the British Bugs website (<http://www.britishbugs.org.uk>) or by searching Flickr (<http://www.flickr.com>). — R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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***Aradus cinnamomeus* Panzer (Hem.: Aradidae) new to Oxfordshire.** – On 2 September 2011, I was sweeping along the edges of the main ride at Burnt Platt Wood, near Stoke Row in the Oxfordshire Chilterns. In an area of Scots pines (*Pinus sylvestris* L., Pinaceae), along the side of a felled pine, I swept a single specimen of the flatbug *Aradus cinnamomeus* (OS grid reference SU694833) (Plate 8, Fig. 2).

This species was first found in Britain by Dr Denis Leston at a field meeting of the South London (now British) Entomological and Natural History Society at Byfleet, Surrey on 8 July 1950 (Leston, 1951a). The insect was initially thought to be a nymph of another *Aradus* species, but on taking more specimens of the bug in the following year at Oxshott, Surrey, his companion on that occasion, Dr Haakon Lindberg, identified them as *A. cinnamomeus* (Leston, 1951b). There then followed a flurry of activity by some of the great heteropterists of the era, adding four further sites in Surrey (Ash Vale, Horsell Common, Walton Heath and Wisley Common), Crowthorne in Berkshire, Burnham Beeches in Buckinghamshire, a site near Aldershot in North Hampshire, in the New Forest in South Hampshire, and on Studland Heath in Dorset (Leston, 1951c & 1951d; Southgate & Woodroffe, 1952a, 1952b & 1953; Swain, 1952; Woodroffe, 1952 & 1955). All the insects found were associated with young pines, and most were obtained from under the bark of the trees, sometimes in large numbers.

There the county recording seems to have rested. The only published records I have found since then are those of Denton (1997 & 1998), reporting the bug from three new sites in Surrey. The present site in Oxfordshire is a small area of sandy heath at the south-western end of the Chiltern Hills. I reported my find to the Oxfordshire county recorder, Mr John Campbell, and to Dr Bernard Nau. I am grateful to Dr Nau for his comments concerning the status of this species.

An image of the specimen has been placed on Flickr (<http://www.flickr.com>) in the photostream RobRyanBugs, and some rather superior photographs of the bug can be found on the same website from the camera of Dr Tristan Bantock (photostream tristanba). – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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***Miridius quadrivirgatus* (A. Costa) (Hem.: Miridae) in Berkshire.** – The traditional haunt for this species (Plate 9, Fig. 3) is in the coastal counties of southern Britain, usually occurring in pastures and wasteland near the sea (Southwood & Leston, 1959). However, in 1982 the insect was taken in Surrey, at Effingham on the North Downs (Porter, 1985), and since then there have been several more records for the county. Hawkins (1989) reports the bug 8km to the north at Oxshott Heath and 15–20km to the south at two sites near the West Sussex border. Later, he reports it 20km to the south-west at Milford (Hawkins, 1994) and Denton (2004) found it nearby at Godalming. Subsequent records added more inland counties to the bug's known distribution: North Hampshire (Denton, 2008); Worcestershire (Bloxham, 2009); Shropshire (Dodd, 2009); and East Gloucestershire (Widgery, 2008 & 2010).

On 17 July 2006, I was exploring Wildmoor Heath (Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust Reserve), Crowthorne, Berkshire, close to the border with North Hampshire, and swept two examples of the bug (OS grid reference SU842630). This was my first visit to the site and, in spite of several more visits since, I have not been able to repeat the feat. However, on 27 June 2009 I swept a single specimen at The Holies (National Trust), above Streatley, Berkshire at the north-eastern end of the North Wessex Downs, a short distance from the Oxfordshire border (SU592800). This is a site I have visited every year since 2006, usually several times each year, but so far I have only the single record of the bug here. I have, however, had more luck in Surrey, finding 10 individuals on 19 and 26 July 2008 at Chobham Common (SU966650), adding yet another site to this county. These insects were all located in a small area of longer grass alongside a path leading from the nearby car park.

Mine are not the first records for Berkshire. In 2003, the insect came to my light at Heron's Nest (SU6669), south-west of Reading (Denton 2004). However, it is useful to confirm such light-trap records by field work, as it is not always certain from where the insects have travelled. This record, like mine, has county boundaries nearby, the Heron's Nest site being about 6km south of the border with Oxfordshire and about 7km north of the border with North Hampshire.

Some excellent images of the bug can be found on the British Bugs website (<http://www.britishbugs.org.uk>) or by searching Flickr (<http://www.flickr.com>). – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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A new record of the hornet beetle, *Leptura aurulenta* Fabr. (Col.: Cerambycidae) for North Hampshire. – In the early afternoon of 31 July 2011 a flying female *Leptura aurulenta* (Plate 8, Fig. 4) landed briefly my wife’s arm then fell on to the lawn in my garden (SU 73). It stayed there motionless for several minutes while I went to fetch a suitable box to examine the beetle in more detail. At this time the sun was very bright and the maximum temperature for the day was 25°C.

Twinn and Harding’s (1999) map shows fourteen 10 Km squares where *L. aurulenta* has been recorded since 1970. It is regarded as a very local southern species (Notable A) occurring from West Cornwall to West Sussex where it has been “ . . . found in broad-leaved and pasture woodland, chiefly associated with oak (*Quercus* spp.) . . . ” Although there is an ancient woodland site within one kilometre of my garden; the nearest pasture woodland, together with the wood-decay material to which this species is associated (Alexander, 2009) is six kilometres to the east. The nearest recent record of *L. aurulenta* known to me is two live adults from the Brockenhurst area in the New Forest in 1999, which is 50 kilometres to the south-west (C. Tilbury, pers. comm.). However, a ‘long-dead’ specimen was recorded in SU36 (Denton, 2002), being about mid-way between the New Forest site and the present record in Chawton.

Photographs of this specimen were used to check its identity by comparison with the excellent series of photo-images available on an internet website. – CLIVE CARTER, Woodbank, Northfield Lane, Chawton, Hants, GU34 1SN.

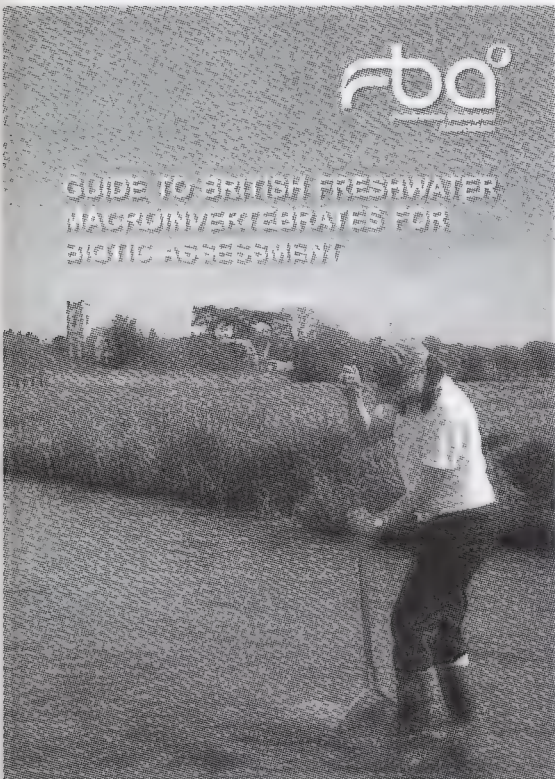
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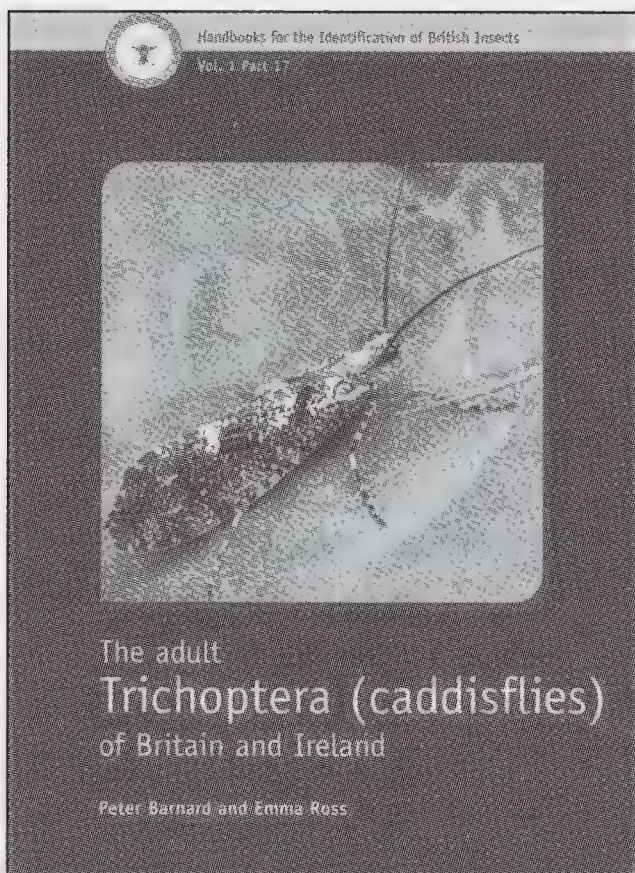
BOOK REVIEWS



Guide to British Freshwater Macroinvertebrates for Biotic Assessment. FBA Scientific Publication No. 67. compiled by Simon Pawley with contributions from Michael Dobson and Melanie Fletcher. (Freshwater Biological Association, 2011). 80pp. Softback £25.00. ISBN 978-0-900386-79-4.

This book provides straightforward, easy to use guides to the identification of macroinvertebrate families used in freshwater biotic assessments in the UK, covering all aquatic orders of insects, crustaceans, arachnids, flatworms, annelids and molluscs. By making extensive use of appropriate methods for different groups, including dichotomous keys, pictorial guides and tables, together with numerous line drawings and general tips on identification, it allows rapid and confident identification of the major groups of British freshwater invertebrates (i.e. Odonata, Plecoptera, Trichoptera and Coleoptera).

JOHN BADMIN



The adult Trichoptera (caddisflies) of Britain and Ireland by Peter Barnard and Emma Ross. Handbooks for the Identification of British Insects Volume 1 Part 17. 192pp. Published for the Royal Entomological Society by FSC Publications, 2012. Softback £29.50. ISBN: 978-0-901546-94-4.

This is a book British entomologists have been waiting for, for over 70 years – a decent, attractive, fully-illustrated, comprehensive, colour identification guide to caddisflies. It is a mystery why this relatively small group of otherwise attractive insects has been side-lined for so many years. One simple reason is that there have just been no recent books of any merit to encourage entomologists to study this group. The authors are very complimentary of Macan's 1973 *Key to the Adults of the British Trichoptera* but in truth it was a publishing failure. After struggling with 40 couplets

or so you end up with a name, for example *Psychomyia fragilis* or a few couplets further on – *Tinodes rostocki*: but that is all you get – a name, with no supplementary biological information at all to help confirm your identification. The former caddis is common and widespread, the latter is very local in the UK. How do you tell? The figures of insect parts are very detailed and very helpful at times, but there are only five whole insect 'pen and ink' drawings to coax the user to study caddis adults. You can just imagine how a lepidopterist, who is used to lots of whole insect (colour) illustrations and is thinking of identifying caddis might react! It makes you wonder whether the compilers ever thought of how other entomologists might use the key and what they might use it for.

How have we progressed? Well, first of all the new Handbook is liberally illustrated with colour photographs of caddisflies *in situ* taken by Emma Ross, so that the user has a much clearer understanding of the range of different shapes and sizes of caddisflies one is likely to encounter in the British Isles. Some such as *Trichostegia minor* (Curtis), *Agrypnia varia* (Fabr.), *Glyptotaelius pellucidus* (Retzius), *Limnephilus marmoratus* Curtis, *Beraea maurus* (Curtis) and the familiar angler's Black silverhorn *Mystacides azurea* (L.) are extremely attractive. The colour forms of *Philopotamus montanus* (Donovan) are so strikingly different they have been variously considered as subspecies or varieties. These photographs should certainly assist users to identify caddisflies more easily.

The format of the RES Handbook follows a familiar pattern. There are preliminary chapters on 'Life cycles and biology', 'Morphology', 'Collecting and preserving of caddis', 'Higher classification of Trichoptera' and a 'Check list of British species'. The last complete check list of the British and Irish Trichoptera was published by the senior author, Peter Barnard, over 25 years ago. There has been one addition and one deletion to the species list over the intervening period. Of the 199 species currently on the overall list, three (*Apatania auricula* (Forsslund), *Limnephilus fuscinervis* (Zetterstedt) and *Tinodes maculicornis* (Pictet)) are known only from Ireland, not Great Britain, even though all three occur in mainland Europe.

Most of the drawings for the keys were sourced from previous publications as they are perfectly adequate: wing venation diagrams originally prepared by D. E. Kimmins for Mosely's classic (1939) book; the Hydroptilidae from Marshall (1978, 1979) and the figures of female genitalia of *Tinodes* from Fisher (1977). The authors point out that identification of caddis below family level relies very heavily on differences in the

genitalia, necessitating two separate, highly descriptive keys, one for each sex, with alternative couplets invariably stating “not as above”. A recent innovation has been Malicky’s (2004) approach where the traditional key has been supplanted with a pictorial guide, an atlas, where similar species are grouped together for easy comparison with minimal text. The authors here have adopted a hybrid approach: there are keys to families, with keys to genera or generic groups, each with numerous pictures, usually coloured, of wings and wing venation, together with relevant genitalia figures.

For each species, the correct scientific name is given, with taxonomic notes on where the species differs from the last checklist (Barnard, 1985); common name used by anglers, current conservation status where known, a brief description of wing patterns, together with photos of pinned and live specimens. A summary of the known distribution in Great Britain is included based on information provided by Ian Wallace, UK Caddis Recording Scheme co-ordinator; main flight period and some details on larval habitats. The genitalia of both sexes are figured, with useful arrows indicating critical characters to separate species from their nearest neighbours.

The hybrid key looks impressive and worked easily with several of the larger species from my own collection that were taken ‘at light’. This is another ground-breaking Handbook from the Royal Entomological Society and should go a long way to popularising the recording of this group of charismatic insects. I am reminded of the state of syrphid recording in the UK prior to the publication Alan Stubbs and Steve Falk’s definitive British Hoverflies book in 1983. The number of taxa then, 256, is only slightly larger than the number of UK caddis today (199). There have been upwards of 20 papers a year on hoverflies ever since, with a dedicated Hoverfly Newsletter: by contrast at the moment there have been less than 20 articles in total on UK caddis since 1970. As editor I look forward to receiving some interesting articles on caddisfly distribution and biology as a result of the publication of this extremely useful this book.

JOHN BADMIN

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FIELD MEETING REPORTS

Northants and Peterborough Diptera Group in 2011

Leader: **John Showers**. – Our first Diptera Group field meeting in 2011 took place at **Abington Meadow, Northampton** on 24 April. The hoverflies *Neoascia podagrica* (Fabr.) and *N. meticulosa* (Scopoli) were recorded by Tony White and several *Helophilus hybridus* Loew were noted. Several examples of the scathophagid *Cleigastra apicalis* (Meigen) were swept from the rushes.

The 1st May saw us at **Salcey Forest** in hot and dry conditions. Flies were not particularly prevalent although Brian Harding found a *Criorhina berberina* (Fabr.) and Graham Warnes swept *Pipiza luteitarsis* Zetterstedt from one of the rides. The 8th of May meeting was at **Barnes Meadow, Northampton** although I was unable to attend. Again *H. hybridus* was recorded. The warm spring seems to have brought this species out into the open as we do not get many records of it in Northants. *Parhelophilus versicolor* (Fabr.) was found by Graham Warnes, another uncommonly reported species. At **Stoke Wood** near Desborough (15.v.2011) we hoped to find the hoverfly *Cheilosia chrysocoma* (Meigen) as well as to search for other spring flies in this well-managed ancient wood. As it turned out the weather was notably cool and blustery and only myself and Keith Walkling, the warden, turned out. Needless to say we did not find our target species on this date and hoverflies were few and far between. Searching under sheltered vegetation produced my first fungus gnat of the season *Macrocera phalerata* Meigen (Keroplatidae). There were also several limoniids, including *Epiphragma ocellare* (L.) with its ring-shaped markings on the wings. On 22nd May we returned to a private garden at **Greens Norton** and the local community-run pocket park. Most of the records were of common species but the reed mace in the pocket park did yield the hoverfly *Anasimyia lineata* (Fabr.). Given the paucity of data from this part of the county, any records help to fill in the distribution picture for VC32. The last May meeting was on 29 May at **Bradlaugh Fields, Northampton**. Although we failed to find the ulidiid *Dorycera graminum* (Fabr.) yet again, it turned out to be a very productive meeting. Our timing for *D. graminum* may have been too late as the warm season meant that the hawthorn flowering was already largely over and it has been noted that the fly visits hawthorn. The most interesting finds were of tachinids. Tony White found the rare *Thecocarcelia acutangulata* (Macquart), an RDB2 species. I found *Cistogaster globosa* (Fabr.), a southern species recorded mainly from the Hampshire and Wiltshire Downs. Apparently it has a habit of turning up and disappearing from areas but this record is one of the most northern locations that it has been recorded. Therevids are not often reported in the county so finding *Thereva nobilitata* (Fabr.) was pleasing even though it is a widespread species. The robberflies *Dioctria rufipes* (De Geer) and *Leptogaster cylindrical* (De Geer) were also noted.

On 5 June we visited **Old Sulehay Forest** in the north of the county. Being so far north the Diptera Group was down to Graham Warnes and myself but we were joined by Tony Drane, the county beetle recorder, and another coleopterist. The hot conditions were not ideal but in the shelter of the forest ride we recorded the hoverflies *Volucella inflata* (Fabr.) and *Rhingia rostrata* (L.). The **Summer Leys** visit (12.vi.2011) was a complete washout! So on to 19 June, where we visited Scotland Wood on the **Kelmarsh Estate**. This wood is a planted ancient woodland site (PAWS). It is in the process of having much of the planted conifers removed to allow regeneration of native trees so will be an interesting area to record in as the site changes. Opening up the canopy had produced a fine crop of broad-leaved

helleborines in the compartment where we spent most of our time. Graham Warnes found both *Xylota sylvarum* (L.) and *X. xanthocnema* Collin, two hoverflies associated with ancient woodland, as their larvae live in rotting wood. The final June meeting was to the Wildlife Trust reserve at **Ring Haw, Yarwell** where Graham Warnes, Jon Cole and I visited the restored limestone grassland on Sammock's Hill and the wet flush on the reserve. Not all records from the visit have been received yet but the flush produced the soldierflies *Oxycera nigricornis* Olivier, *O. pardalina* Meigen and *Vanoyia tenuicornis* (Macquart).

The first group meeting in July was the Bioblitz event at **Irthlingborough Lakes and Meadows** (3.vii.2011). The Wildlife Trust are taking on the management of this large reserve and are keen to record what it currently supports as a basis for a management plan. The most notable record was of the hoverfly *Epistrophe diaphana* (Zetterstedt), found on brambles in the drier edge of the reserve. This site looks very promising and a return visit is to be made in 2012. Next, a trip to the North of the county to **Short Wood**, near Glapthorn (10.vii.2011) in beautiful weather gave us a chance to look at this fine ancient woodland. Two less common hoverflies found there were *Eumerus ornatus* Meigen and *Volucella inflata*. The visit to **Southfield Farm Marsh, Barton Seagrave** (17.vii.2011) was nearly a washout with cool windy and damp conditions. Two soldierflies were found: *Chorisops tibialis* (Meigen) and *Beris vallata* (Forster), also two snipe flies: *Chrysopilus cristatus* (Fabr.) and *C. asiliformis* (Preyssler). The latter has had few records in Northants. On the 24 July we visited **Old Pastures**, one of the woods on the Compton Estate. Weather conditions were good and the site turned up some notable finds. Of the hoverflies, *Cheilosia scutellata* Fallén, *C. soror* Zetterstedt, *Didea fasciata* Macquart and *Platycheirus europaeus* Goeldlin de Tiefenau, Maibach & Speight were the more interesting but Tony White's find of *Eupeodes lapponicus* (Zetterstedt) was a real turn up for the books. The final visit of the month was to **Raw Haw Wood** (31.vii.2011), which did not turn up anything unusual but the hoverflies *Platycheirus rosarum* (Fabr.) and *Leucozona laternaria* (Müller) which are not often recorded around here.

The August field meetings started at **Ditchford Meadows and Gravel Pits** (7.viii.2011). A low turn-out did not discover anything unusual, although all records are still valuable. The following week we visited the lovely **High Wood and Meadows** near Daventry (14.viii.2011), an unusual site in Northants as it contains acid grassland on an area of high ground. The dolichopodid *Argyra ilonae* Gosseries was found by Tony White and we totalled 28 species of hoverfly, including *Sphaerophoria interrupta* (Fabr.) and *Melangyna compositarum* (Verrall). Also recorded were the conopid *Conops quadrifasciatus* De Geer, the heleomyzid *Suillia variegata* (Loew), the scathophagid *Cordilura ciliata* Meigen and the tachinid *Epicampocera succincta* (Meigen). The **Pitsford Reserve** meeting (21.viii.2011) produced the syrphids *Eupeodes latifasciatus* (Macquart) and *Volucella inanis* (L.) and also the muscid *Lispe tentaculata* (De Geer). The final meeting of the month was to **Farthinghoe Reserve** (28.viii.2011), our first visit to this interesting disused railway cutting. The tiger crane fly *Nephrotoma flavipalpis* (Meigen) was probably a Northants county first. *Cheilosia soror* (Zetterstedt) was noted by several observers. The site also produced two sciomyzids: *Tetanocera ferruginea* Fallén and *T. hyalipennis* von Roser. Six species of tachinid were also found, including: *Eurithia anthophila* (Robineau-Desvoidy), *Solieria pacifica* (Meigen) and *Macquartia grisea* (Fallén).

Our final group meeting of the season was to **Barnes Meadow** in Northampton (11.ix.2011). The riverside vegetation held several of the late-season soldierfly *Sargus bipunctatus* (Scopoli). Also found were the scathophagid *Scathophaga suilla* (Fabr.), the muscids *Hydrotaea parva* Meade, a nationally notable species, and

Thricops nigrifrons (Robineau-Desvoidy) and the tachinid *Siphona geniculata* (De Geer).

Bogbuie Wood, The Black Isle, Ross-shire, 4 June

Leader: **Margaret Currie**. – Just north of Inverness, on the east coast of Scotland, lies the Black Isle, and it was here that the two outings searching for the day-flying narrow-bordered bee hawk-moth *Hemaris tityus* (L.) and its larvae took place.

The events were organised jointly between Butterfly Conservation's Highland Branch and Forestry Commission Scotland, who own most of the extensive coniferous woodland planted along the crest of the Black Isle. Our destination, Bogbuie Wood, is only a small part of this large wooded area. It has good wide tracks where the verges support a lovely variety of flowering plants including plenty of devils-bit scabious (*Succisa pratensis*), the main food plant for the larval stages of *H. tityus*.

The moths were first found in this wood in June 2010. On a warm afternoon at least fourteen were counted nectaring on bird's-foot trefoil (*Lotus corniculatus*), without doubt more were present but an accurate count was impossible. This fantastic moth could at first sight be mistaken for a very large bumblebee, though the quick bursts of flight and its hovering action when feeding soon make its identity obvious.

So, having set the scene, on the rather chilly morning of the 4 June 2011, a group of fourteen people set off into Bogbuie Wood. It was not too long before the hawk moth was spotted and eventually we saw a total of five, not as many as hoped for, but everyone was happy to have seen them, especially the people who had not come across the species before. Some additional Lepidoptera recording was also undertaken.

Lorenden Park, Painter's Forstal, Kent, 10 July 2011

Leaders: **John Badmin** and **Gillian Keel**. – This was a joint meeting between members of the Kent Field Club and the British Entomological and Natural History Society. The party of 15 met at the Alma Pub in Painter's Forstal and were given a brief introductory talk about the history of Lorenden Park and Lorenden School by Michael Barnett, treasurer and trustee of Lorenden Parkland Trust. A large part of the Park is now open to the public with a main entrance just at the top of 'darky hill' near the pub as you enter the village. The hill acquired its shady name from a canopy of mature trees including yews but these largely disappeared during the night of the Great Storm in 1987 – though the canopy is now beginning to close over again.

Gillian Keel, a local botanist acted as our guide. First we walked through a wooded area of sycamore, mature sweet chestnut and beech and then to a series of open sunny glades where there were large patches of ragwort, amply festooned in places with larvae of the cinnabar moth. Flowerheads of knapweed *Centaurea nigra*, creeping thistle *Cirsium arvense*, St John's Wort *Hypericum perforatum* and ox-eye daisy *Leucanthemum vulgare*, together with small vetches were a welcome sight. Among the bumblebees noted were *Bombus terrestris* (L.), *B. lucorum* (L.), *B. pascuorum* (Scopoli), *B. lapidarius* (L.) and *B. hypnorum* (L.). There was a fair sprinkling of butterflies – small skipper, gatekeeper, meadow brown, ringlet, large and green-veined whites, comma and red admiral. Lycaenids included holly blue, common blue and small copper and Tony Rouse even spotted a resident white-letter hairstreak *Satyrion w-album* (Knoch). Simon Springate recorded honeysuckle whitefly *Aleyrodes lonicerae* Walker and the leader horse chestnut scale *Pulvinaria regalis* Canard.



Fig 1. Lorenden Park, looking west up Peasdown bank, January 2011. Photo: Michael Barnett.

We then walked into a large open grassy area, ‘the cricket ground’ with a mix of mature trees growing around the perimeter. Later on, along the northern side we encountered a huge patch of teasel *Dipsacus fullonum* which proved attractive to many insects including the cuckoo bumblebee *B. vestalis* (Geoffroy in Fourcroy). There was also a large colony of marbled white *Melanargia galathea* ssp. *serena* Verity. Grant Hazlehurst recorded a long list of Hymenoptera that included the sphecids *Crossocerus cetratus* (Shuckard), *C. annulipes* (Lepeletier & Brulle), *C. megacephalus* (Rossius), *Ectemnius continuus* (Fabr.) and *Mimumesa dahlbomi* (Wesmael) and the nationally notable eumenid *Microdynerus exilis* (Herrich-Schaeffer). This latter species is rather scarce in Kent with just ten recent site records though it is known to be extending its range generally (Allen 2009, *Bees, wasps and ants of Kent*). The area buzzed with flies, but only a few notable ones were recorded – the hoverflies *Volucella zonaria* (Poda), *V. inanis* (L.), *V. pellucens* (L.), *Cheilosia soror* (Zetterstedt), *C. bergenstammi* Becker and the stratiomyids *Pachygaster atra* (Panzer) and *Beris morrisii* Dale.

Hemipterous species noted by the leader included the large, introduced, bright green jassid *Iassus scutellaris* (Fieber) and native, duller *I. lanio* (L.), *Alebra albostriella* (Fallén), the typhlocybines *A. viridis* (Rey), *A. wahlbergi* (Boheman), *Ribautiana scalaris* (Ribaut), *R. ulmi* (L.), *R. tenerrima* (H-S), *Lindbergina aurovittata* (Douglas), the froghopper *Aphrophora alni* (Fallén), the issid *Issus coleoptratus* (Fabr.) and cixiid *Cixius nervosus* (L.), a list largely determined by the absence of the leader’s sweep-net.

Some of the trees in the wooded areas had been selectively felled and some left to decay so there were lots of microhabitats to investigate. Interspersed among the native trees was an old orchard and a few tall exotic firs. Turtle doves cooed above. The plant list produced by Joyce Pitt extended to 100 species: none was

scarce or rare, but it was nice to see species such as fiddle dock *Rumex pulcher* and ploughman's spikenard *Inula conyzae*. Fourteen corticolous lichens were noted including *Punctelia ulophylla* and *Flavoparmelia caperata* confined to old apple.

The lower part of the estate to the east with bridge marked the route of the old nailbourne stream and at times this area is wetter (Fig. 1). Old photographs at the turn of the 20th century show a 2m wide river flowing under the A2 a mile or so north, but the nailbourne has dried up in recent decades and has attempted to flow only twice in my time in Kent. Near here under various bits of sheeting and mats we recorded common frog, toad, common lizard and slow-worm.

Everyone felt the park was well managed with some areas receiving more remedial attention than others, at different times, so that a patchwork of habitats was being created, ideal for maximising biodiversity. The park would obviously benefit from another recording visit at a different time of the year. The records are stored at the Kent & Medway Biological Records just along the road at Brogdale.

Gillian Keel then took us on a walk across the field opposite which had been recently seeded with a mix of wildflowers and we encountered another large colony of marbled white and six-spot burnet *Zygaena filipendulae* ssp. *stephensi* Dupont. As time was then getting on, we had to decline Gillian's kind offer of tea back at her house – but another day perhaps.

Bogbuie Wood, The Black Isle, Ross-shire, 23 July 2011

Leader: **Margaret Currie**. – It was always the intention to have a return trip to this area later in the year to search for the caterpillars of *H. tityus*. Consequently, on 23 July 2011, eight individuals from Highland Branch, who were prepared to spend several hours on their knees, arrived to search the undergrowth. The larva of this moth is equally as distinctive as the moth itself, a very handsome creature with bright green body work embellished with pink. The trick was to find a leaf of the devils-bit scabious with a hole chewed in it, then turn it over and possibly find what we were looking for. Eventually we found 26 larvae, a remarkably good result. We had our breeding colony of narrow-bordered bee hawk-moths.

As a result of the survey, and thanks to the Inverness office of Forestry Commission Scotland, late season mowing of the verges has been incorporated into the site management programme in order to reduce rank vegetation. This happens after the scabious have set seed so helping the spread of the plants. The larvae are not affected as at this point they have already pupated into the leaf litter or are underground.

Muir of Dinnet National Nature Reserve, Aberdeenshire, 27 July 2011

Leaders: **Helen Rowe** and **Catriona Reid**. – Two light-traps (a Robinson and a Heath trap) were run overnight on the National Nature Reserve near the visitor centre and members of the public were invited to inspect the catch on the following morning. Eighteen members of the public including several children attended the moth event itself. The leaders gave an introductory talk on moth ecology before opening the traps. A spotted flycatcher also took a very active part in the proceedings.

A total of 41 lepidopterous species was recorded, including both swallow prominents *Pheosia tremula* (Clerck) and *P. gnoma* (Fabr.), common lutestring



Fig.1. *Scoparia ancipitella* female.
Photo: Patrick Clement.

Ochropacha duplaris (L.), the noctuids true lover's knot *Lycophotia porphyrea* (D. & S.), minor shoulder-knot *Brachylomia viminalis* (Fabr.), antler *Cerapteryx graminis* (L.), scarce silver Y *Syngrapha interrogationis* (L.), broad-bordered yellow underwing *Noctua fimbriata* (Schreber) and small square-spot *Diarsia rubi* (Vieweg). Geometers included Welsh wave *Venusia cambrica* Curtis, barred red *Hylaea fasciaria* (L.), dark marbled carpet *Chloroclysta citrata* (L.), scalloped oak *Crocallis elinguaris* (L.) and small rivulet *Perizoma alchemillata* (L.). It was also nice to see map-winged swift *Hepialus fusconebulosa* (De Geer). Of note among the micros were the nationally scarce pyralid *Scoparia ancipitella* (de la Harpe) (Fig. 1) known previously from this site, *Eudonia angustea* (Curtis) and *Ypsolopha parenthesella* (L.).

Kincorth Hill Local Nature Reserve, Aberdeen, 29 July 2011

Leaders: **Helen Rowe (Aberdeenshire Council Ranger) & Rob Rowe (Aberdeen City Ranger)**. This event was held to inform people about the diversity of nocturnal life on their doorstep, particularly bats and moths, while adding biological records for the reserve. About 15 members of the public attending helped set up light-traps – an mv Skinner trap was run in woodland/grassland habitat and an actinic Heath trap was located in a patch of heathland. The children present enjoyed painting sugar mixture on tree trunks that were checked later to see what insects had been attracted. Dusking with sweep nets also took place as well as a walk with bat detectors, which picked up pipistrelle bats, probably both common and soprano pipistrelle, plus possibly the very quiet echolocation of brown-long eared bats. Thirty-four lepidopterous species were recorded, including the plain golden Y *Autographa jota* (L.) (scarce in NE Scotland) and commoner, but charismatic moths such as scalloped oak *Crocallis elinguaris* (L.). Also of interest were antler moth *Cerapteryx graminis* (L.), northern spinach *Eulithis populata* (L.) and juniper pug *Eupithecia pusillata* (D. & S.). Among a number of micros were the pyralid *Catoptria falsella* (D. & S.) and beautiful plume moth *Amblyptilia acanthadactyla* (Hübner), both locally occurring species and the conifer feeding tortricid *Zeiraphera ratzeburgiana* (Ratzeburg).

Regional Meeting at the FSC Preston Montford, Shropshire, 18–19 September 2012

Organisers: Peter Boardman and Claudia Watts. – The third annual Shropshire Entomology Day, organised by the Invertebrate Challenge (IC) and the Shropshire Invertebrates Group (SIG) was extended into a full weekend for the occasion.

On the Saturday events were kicked off by BENHS President Tony Pickles who welcomed attendees to the day, and as by tradition, BENHS members to the Society. This was followed by a number of presentations about a variety of entomological

subject areas including a review of the work of the Wyre Forest Study Group by Rosemary Winnall. This included survey work on the scarce seven-spot ladybird *Coccinella magnifica* Redtenbacher and lemon slug *Malacolimax tenellus* (O. F. Müller), two of the many specialities from the Wyre Forest. Ian Thompson (SIG) presented an introduction to the Ephemeroptera of Shropshire, whilst new and exciting Shropshire entomological finds were summarised by Nigel Jones (VC40 hoverfly county recorder). Of particular interest in Nigel Jones' presentation was the discovery of the hoverfly *Callicera rufa* Schummel from a couple of sites in Shropshire (initially by an Invertebrate Challenge student, Keith Fowler) (Jones, 2011). Subsequently the fly has been found elsewhere in central England a long way from its more expected habitat of Caledonian pine forest (Jones, 2012).

Sue McLamb, the new Odonata recorder for VC40 encouraged people to adopt previously unloved hectads for the final year of the British Dragonfly Society atlas project and Godfrey Blunt (SIG) took a look at the plant galls caused by mites that entomologists might record whilst out and about. Proceedings were brought to a close by Pete Boardman (IC project officer), who updated the 55 attendees of the progress of the Invertebrate Challenge, a three year Lottery funded project based at the Field Studies Council that is charged with aiding and encouraging serious entomological study by local volunteers who are each looking at one of the families or wider groups of Syrphidae, Tipulidae, Coleoptera, Aculeate Hymenoptera or Araneae. Pete also ended with a short talk on the use and misuse of insects and invertebrates in the lyrics of modern popular music.

On Sunday a number of identification workshops were held at Preston Montford, attended by 42 people. Don Stenhouse of Bolton Museum led a workshop on field techniques aimed at finding a variety of terrestrial and aquatic Coleoptera; Ian Cheeseborough (VC40 county aculeate recorder) ran an indoor session getting to grips with the solitary bee genus *Nomada*; Nigel Jones introduced the Dolichopodidae family of flies, whilst Paul Lee led a spider identification workshop. These workshops were intended to be both a continuation of the Invertebrate Challenge workshops but also to welcome new attendees for taster session in these subjects, and of course visiting BENHS members. Of special note was the formation and initial meeting on the day of 'The Shropshire Spider Group', a group formed out of the Invertebrate Challenge spider workshops.

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DIPTERISTS FORUM FIELD MEETINGS – AN OVERVIEW OF 2011

ROGER MORRIS

*7 Vine Street, Stamford, Lincolnshire PE9 1QE**roger.morris@dsl.pipex.com*

INTRODUCTION

Dipterists Forum is affiliated to the British Entomological and Natural History Society and its field meetings are open to all BENHS members and those of other related societies. There are usually at least three meetings each year, a short spring meeting of two or three days, a week-long summer meeting and an autumn meeting that usually lasts a week. Additional meetings are also arranged when the opportunity arises. The main summer meeting is usually based at a university, school or field centre, providing half board together with accommodation for communal microscopy sessions in the evening. Although the majority of the participants are dipterists a broader spectrum of entomologists often join the group, especially hymenopterists and coleopterists. The Forum is always keen to extend a welcome to other entomologists, especially to micro-lepidopterists whose daytime fieldwork often compliments that of the dipterists. In 2011 three field meetings were organised: Abergavenny, Exeter and Sussex. Each was well attended and yielded important new finds that extended our knowledge of the British insect fauna.

High points

Abergavenny (12–15 May, 2011). A total of 20 members attended for all or part of the weekend. The weather was somewhat patchy and therefore not entirely ideal for sun-loving species. The most important record of the weekend was probably the scathophagid *Cosmetopus dentimanus* (Zetterstedt) from a wooded gorge on the River Usk late on the first day in drizzly overcast conditions at Llangynidr Bridge. Thanks to intermittent good weather several interesting hoverfly records were made, including *Rhingia rostrata* (L.) which is rapidly becoming a standard issue in the Welsh borders. *Xanthogramma citrofasciatum* (De Geer) and *Volucella inflata* (Fabr.) were also noteworthy as were the clouds of *Sphegina sibirica* Stackelberg at hawthorn blossom at Mynydd Du Forest. The asilid *Dioctria oelandica* (L.) and the muscid *Phaonia latipalpis* Schnabl in Schnabl & Dziedzicki from Coed-y-Cerrig National Nature Reserve were illustrative of the quality of this wonderful alder carr at the bottom of a valley with oakwoods on its slopes. Craneflies fared comparatively well with the spectacular *Ctenophora pectinicornis* (L.) from Allt-y-Esgair Wood. Its near-relative *Tanyptera atrata* (L.) was recorded from Mynydd Du Forest and also from Horse Lawn in the forest of Dean. A total of 71 cranefly species was a moderately acceptable haul, whilst the fungus gnat records comprised 95 species.

Exeter (2–9 July 2011). This was a very well attended meeting at an excellent venue: Mardon Hall on the campus of the University of Exeter. We were allocated the common rooms as our lab, which proved to be highly satisfactory. This part of Devon is well-known for its pebblebed heaths and we visited several of the better examples, recording the curious hoverfly *Pelecocera tricineta* Meigen on a number of occasions. However, possibly the most important find of the week was the muscid *Neolimnophora maritima* (von Röder) from Dawlish Warren; this is only the third record since 1960. Several parties spent time at Yarner Wood NNR which was extremely productive; it yielded 64 species of fungus gnat and several scarce species from other families such as the beefly *Bombylius canescens* Mikan, the tachinid *Lophosia fasciata* Meigen and the empid *Syndyas nigripes* (Zetterstedt). Nearby

Watercleave Wood yielded a further record of *Phaonia latipalpis* and provided those that visited with considerable exercise as the valley side seems almost vertical. Several parties visited the Teign Valley woods, which proved to be immensely productive, including the hoverfly *Neoascia obliqua* Coe and an excellent haul of fungus gnats.

Other highlights for the week included the horsefly *Haematopota subcylindrica* Pandellé (Exminster Marshes), the tephritid *Cryptaciura rotundiventris* (Fallén) (Whiddon Deer Park), the conopids *Thecophora fulvipes* (Robineau-Desvoidy) (Thomas Cleve Wood) and *Zodion cinereum* (Fabr.) (Dunsfold Wood), the acrocerid *Ogcodes gibbosus* (Bovey Heathfield) and larvae and pupiparia of the horse bot fly *Gasterophilus intestinalis* (De Geer) at several localities on Dartmoor. By the end of the week the fungus gnat list had reached 142 species and that for crane flies reached 80 species. Although the main body of the group were dipterists, Coleoptera and Hemiptera figured amongst the records: a specimen of the clerid *Tillus elongatus* (L.) was the first for Devon in at least 100 years and one of the musk beetle *Aromia moschata* (L.) also appears to have been an important new record for Devon.

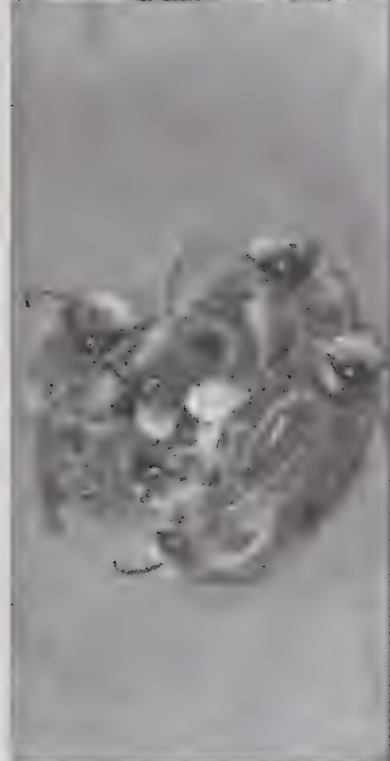
Sussex (8–15 October). This meeting was originally advertised for the Lake District but a difficulty finding accommodation and prospective bad weather led to a last-minute switch of venues. This proved to be fortuitous as the weather in Sussex was excellent whilst it rained almost continuously in the Lake District for much of the week. Two venues were used, one in Worthing and a second in Eastbourne. This meeting is primarily to record fungus gnats and crane flies and attracts a small group of stalwarts – nine in total this year. Although crane fly numbers were poor with 41 species, the fungus gnats were exceptional and a total of 205 species was recorded, including *Neoempheria bimaculata* (von Roser) (Lower Oldfield Copse) and *Phronia forcipula* Winnertz (Burton Mill Pond) which was first recorded in the UK in 2007. *Keroplatus testaceus* (Dalman) that was once a great prize is now seemingly widespread and occurred at several localities. Platypezids were comparatively scarce and just seven species were recorded. Fruit flies (Drosophilidae) meanwhile were better recorded with 14 species. Remarkably, hoverflies were very scarce despite the nice weather and the southern location.

Benefits of field meetings

Dipterists Forum field meetings are an excellent way of providing holidays for people with an interest in invertebrates and a wish to visit new places. During a week-long meeting participants will visit between 15 and 30 sites, although they do so at their own pace and can choose not to exert themselves if they wish. The ethos of the Forum is to encourage participation. This means that you don't have to be an expert to join the group; newcomers are actively encouraged to attend and to learn to collect and identify flies. The summer field meeting in 2011 attracted several newcomers as well as the usual group of stalwarts. One valuable spin-off has been a booking for a Hoverfly Recording Scheme training weekend: *An introduction to Hoverflies*.

Those who are unsure about their captures can get help from other members of the group and can always act as parataxonomists if they feel so inclined. Many of us collect material for other people so that their recording schemes gain additional records. This is a model that could be adopted by other groups and the Forum is always pleased to accommodate new participants with broader interests in entomology.

The Forum is in the process of computerising its data and has now assembled a database of over 80,000 records resulting from the past 15 years' meetings. These are due to be placed on the National Biodiversity Network and will add to the already substantial body of Diptera data that makes the UK the main contributor to GBIF (Global Biodiversity Information Facility).



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Main image: detail from photograph 'Riverfly' by Danny Beath, 2010 winner in NIW2010 Photography Competition.
Other images: 1. 'Beauty from the Beast' - a southern hawker by Sam Baylis; 2. 'Emerging crane fly' by Danny Beath;
3. 'Male solitary bees - Melitta haemorrhoidalis shelter in a campanula flower overnight' by Aerial Bicker.



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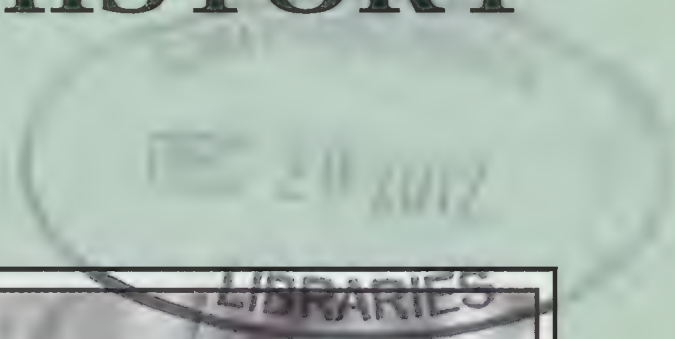
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Editor: J. S. Badmin, H.F.R.E.S., Coppice Place, Perry Wood, Selling, nr Faversham, Kent ME13 9RP (Tel: 01227 752291) email: jbadmin@btinternet.com

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Cover photograph: The pyralid *Cynaeda dentalis*, Old Lighthouse, Dungeness, 10.viii.2012. Photo: Peter Maton.

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THE ECOLOGY OF *ELEDONA AGRICOLA*
(COLEOPTERA: TENEBRIONIDAE)

KEITH N. A. ALEXANDER

59 Sweetbrier Lane, Heavitree, Exeter EX1 3AQ

ABSTRACT

The life history and ecology of the saproxylic tenebrionid beetle *Eledona agricola* (Herbst) are discussed, with particular reference to its fungal host, Chicken-of-the-Woods *Laetiporus sulphureus*, and the age and stand structure of the trees that have been colonized by the fungus. Data are also provided on the land-use types with which the beetle is associated. Its current status and the conservation implications are discussed.

INTRODUCTION

Eledona agricola (Herbst) is a familiar species to many coleopterists across much of England but little has been written about its ecology. Its UK Joint Nature Conservation Committee conservation status is currently Nationally Scarce, *i.e.* it is thought to occur in up to 100 of the 10km squares of the Ordnance Survey National Grid (Hyman, 1992). However, Fowles, Alexander & Key (1999) proposed it be downgraded to ‘Very Local’. It is actually widespread east of a line from Devon up the Welsh Borders and across into Yorkshire – see Fig 1. Alexander (2002) refined the short statement on its ecology provided by Hyman (1992) but there is much more to be said.

Globally, it is a temperate forest species and possibly endemic to Europe (Fauna Europaea). It is known across Europe, from Portugal to Greece, and north into Scandinavia. Its eastern limits are however poorly defined. It is widespread in southwest Germany (Reibnitz, 2010) but uncommon in Denmark (Pedersen, 2005) where it is recognized as vulnerable to selective removal of the veteran trees which support it.

HOST FUNGI

Eledona agricola larvae have only ever been found in the sporophores (brackets) of the heartwood-decay fungus Chicken-of-the-woods *Laetiporus sulphureus* – a species with a number of other vernacular names, such as Sulphur polypore, as well as having been transferred across several genera, including *Polyporus*. The larvae are found after the sporophore has actually become inactive, has died, and presumably the female beetles target freshly dead brackets – although this has not been studied. This association with a single host fungus is clearly stated in both the Denmark and southwest Germany websites already cited. While there have been reports of adults being found on other bracket fungi in England, no reliable evidence for breeding in these has been reported. A distribution map for the host fungus may be found at <http://www.searchnbn.net/gridMap/gridMap.jsp?allDs=1&srchSpKey=NHMSYS0001486136>. This clearly shows that the fungus is much more widespread in Britain than this beetle species.

The association with Chicken-of-the-woods has been known in England for a long time – Elton (1966) comments that “Donisthorpe (1939) was in advance of both contemporary and later entomologists in seeking to get the correct identification of macrofungus fruiting bodies containing beetles, though he did not give the species of tree or the major habitat, nor determine whether the beetles were breeding or not.”

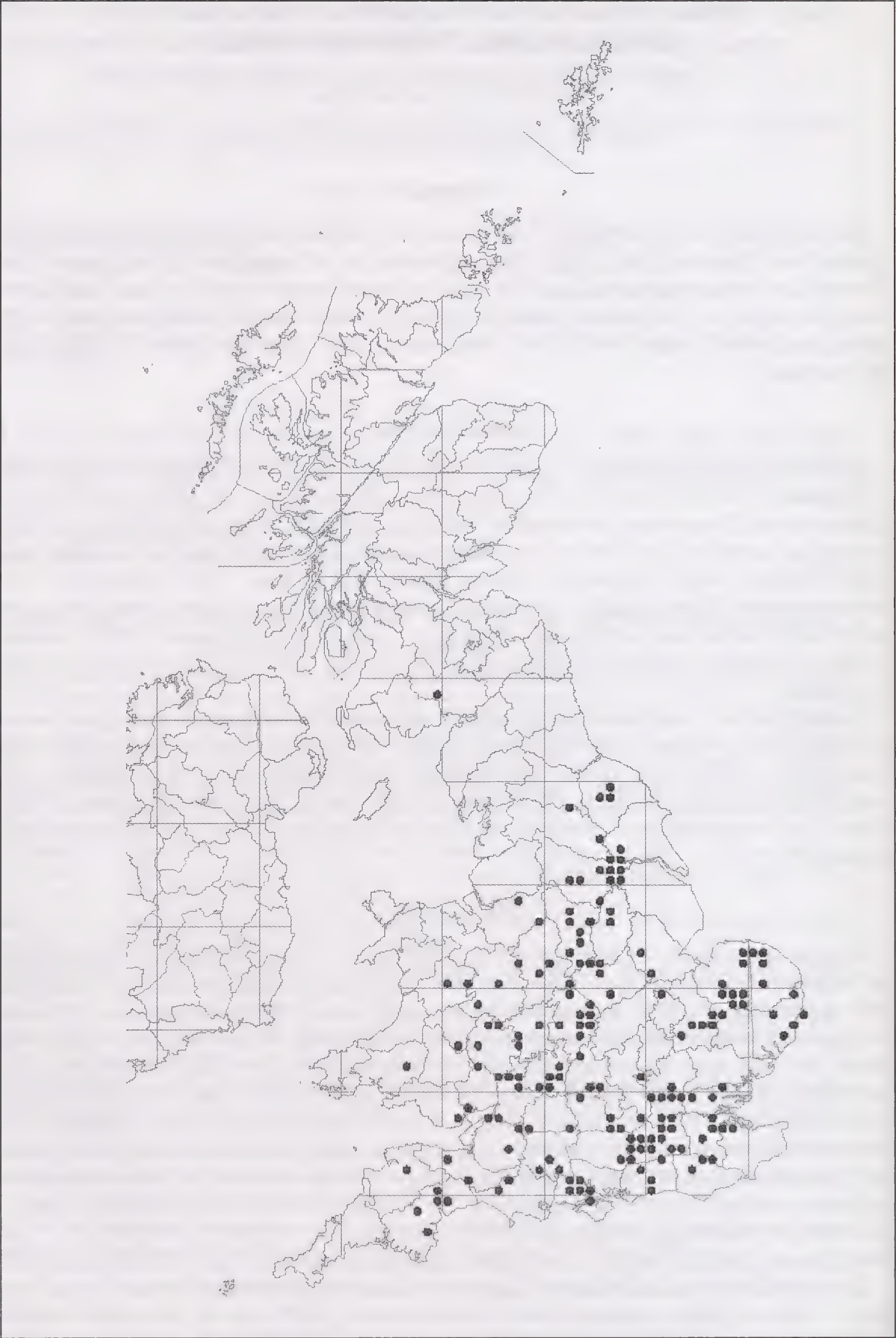


Fig. 1. British distribution of *Eledona agricola*; each dot represents at least one record of the species from that 10km square (mapping supplied by S. Dodd and J. Denton).

Donisthorpe (1939) is very clear: this beetle occurs in abundance in the ‘Sulphur bracket’ fungus *Polyporus sulphureus*. Of course, Elton was himself ahead of his time in recognizing the importance of such omissions. While the species of tree is now recognised as much less relevant – see next section – evidence of breeding and the situation of the tree are today acknowledged as being important considerations. The reliability of fungal identification by entomologists is also an important consideration of course – Lane, Wight & Forsythe (2002) inventing a new genus *Piptopterus*, for example.

While the larvae appear to be very host specific, it seems that the adult beetles may on occasion visit other fungi, presumably for feeding. Hyman (1992) mentions reports from Dryad’s saddle *Polyporus squamosus* and Giant polypore *Meripilus giganteus* – sources are not provided – and also reports Ian McClenaghan having kept a ‘colony’ in captivity on Birch polypore *Piptoporus betulinus*. McClenaghan (pers. comm.) has clarified that he kept a culture of adult *E. agricola* for a month or more from late May 1981 – they had been taken from a bracket fungus on oak (presumably *L. sulphureus*) but were placed with some *P. betulinus* polypore in captivity and proceeded to feed on this fungus (in the absence of any food choice). Johnson (1962) tentatively identified a host fungus as *Daedalea quercina*, but he was not certain of the identification. Payne (1988) reported the beetle from *Meripilus giganteus* on 5.xi.1986, presumably a hungry stray this late in the season. Brendell (1975) states that the beetle occurs “in brackets of the fungi *Laetiporus sulphureus* and *Polyporus squamosus*” but – again – does not provide citations. Buck (1955) is no help as he uses the classic entomological terms of ‘Boleti and Polyporus’ which just refer to fungi with pore-like spore-producing surfaces. Of 115 encounters with *E. agricola* by the present author, between 1988 and 2011, all except two have been found in *L. sulphureus*, never in another bracket fungus – this suggests that occurrences at other fungi are the exception rather than the rule. The two exceptions were beetles found away from fungus – see below.

Laetiporus sulphureus is a heartwood decay fungus, hollowing out the dead interior of living trunks and major branches of a wide range of tree species and digesting the cellulose content leaving the lignin behind to dry out and contract, forming a cuboidal red or brown rot. It is best known from oak but is also of widespread occurrence on cherry, pear, plum, sweet chestnut, willow, yew, and occasionally even on beech, hazel and alder. It hollows trees which have a true heartwood such as oak as well as those with ripewood, such as beech, although trees with true heartwood appear to be strongly favoured.

Trees bearing this bracket fungus are generally old for the species, as the tree needs to have developed a substantial girth before it can be colonized by the fungus, and the fungus needs to have assimilated a lot of dead heartwood material before it has sufficient reserves to invest in producing a fruit body. The beetle appears to be indifferent to tree species, associating primarily with the bracket fungus species – the authors own encounters include once finding the beetle in the fungus fruiting from an old yew tree.

ADULT ACTIVITY

Reports of adult *E. agricola* away from bracket fungi are remarkably scarce. This is surprising given that *L. sulphureus* is an annual fruiting fungus, with fresh brackets appearing from early summer to autumn (Legon & Henrici, 2005). These will attract adult beetles for oviposition and the new generation of beetles will emerge in late summer or autumn. Adults will then need to overwinter somewhere. Fragments of old air-dried bracket fungi do persist on the host trees well into the second season

Table 1. Analysis of British site records of *Eledona agricola* by land-use type

Land-use type	Published records		Personal records	
	Number of sites	Percentage of sites	Number of sites	Percentage of sites
Historic parkland*	25	43	28	44
Floodplain & fen landscape	12	20	2	3
Common wood pasture*	8	14	7	11
Ancient woodlands – excluding those within medieval forests	7	12	5	8
Medieval forest*	6	10	7	11
Traditional orchard			11	17
Hedgerows			4	6
Total wood-pasture type (*)	39	67	42	66
Total	58	100	64	100

and beetles are most readily found during the winter months in such fragments (e.g. Denton, 2000). The beetle is generally assumed to be univoltine, with overwintered adults dying soon after breeding, although this appears not to have been demonstrated. Hyman (1992) mentions that adults have been recorded in January, May and from August to November, but in reality they can be found all year round – the June-July gap he identifies is partly coincident with the period of larval development, but adults have been widely reported in both months (pers. obs.).

The author has only two experiences of finding beetles away from *L. sulphureus*: the first was at Felbrigg Beeches (TG1939), Norfolk, when it was found in good numbers amongst decaying wood behind the toughened exterior face of the exposed wood of a dead section of a standing beech tree on 6.vi.2000. It was assumed that these were inactive overwintered individuals, awaiting the distinctive aroma of fresh growth of bracket fungus. It is feasible that this beech tree actually contained *L. sulphureus*, although no signs of old bracket fungi could be found – it would make sense to remain in the host tree while awaiting the development of fresh brackets and such a concentration of adults could be taken as suggesting this is indeed what was happening here. The second encounter was a single beetle knocked from an aerial dead branch in the lower crown of an old parkland oak in Belton Park (SK9438), Lincolnshire, 16.ix.2008. Whether this was just a dispersing individual at rest or whether it was intending to overwinter in this situation is not known of course.

The adult beetles do clearly fly of course as they need to actively seek out freshly expired bracket fungi for breeding and reports of adults away from the host fungus may have been attracted to the aroma of fresh fungus. The species does turn up at flight interception traps, e.g. Ranius & Jansson (2000).

ASSOCIATION WITH OPEN-GROWN VETERAN TREES

The bracket fungus appears to need to remain relatively dry to attract *E. agricola* and the beetle is found in association mainly where the tree is growing in open and well-lit situations. Brackets in deep shade and rain-soaked invariably lack *E. agricola* in the author’s experience, although Hammond (pers. comm.) reports it from soggy old brackets fallen to the ground in south-eastern and eastern England – it may be that warm dry conditions are more important in the west of its range.

The need for older trees with advanced heartwood decay, and with relatively dry fungal brackets, tends to mean that *E. agricola* is associated more with open-grown trees than close-grown high forest trees. Hence its well-known associations with ancient wood pasture type situations (Harding & Rose, 1986; Alexander, 2004). However, it appears to be sufficiently mobile in parts of England at least to be able to spread into more secondary type wooded situations provided that these are relatively close and suitable structurally. Hedgerow oaks and waterside willows in particular undoubtedly provide corridors for dispersal out from existing population centres. For this reason it was only given Grade 3 as an indicator species for old growth conditions. In parts of Britain at least, it is a more useful indicator species (Garland, 1983), and is still something of a quality species wherever it is found.

In Table 1, published records have been broken down by land-use types, in so far as this is possible from the information provided. The authors own personal encounters are similarly analysed, for comparison. Sites are only counted once, despite a series of published records. Thus the New Forest is only counted once, for example – otherwise the data would be swamped. It is impossible to eliminate sampling bias as most records arise from casual recording rather than scientific investigation.

This would tend to suggest that recorders have either not found the species in traditional orchards or hedgerows, or have not been publishing records from these situations. The author has carried out a large number of orchard surveys and *E. agricola* is clearly of widespread occurrence in these situations. Hedgerow trees also tend to be surveyed by recorders much less than reserves where access for recording is better. The data are clearly very ‘noisy’ and should be used with caution. It does however demonstrate the strong association with ancient wood pasture type situations – marked with an asterisk. The traditional orchards concerned tend to be rich in typical ancient wood pasture saproxylic beetles and so their inclusion in the wood – pasture data would make ecological sense. This would bring the percentage of wood-pasture situations to a much stronger value of 83%.

The floodplain and fen landscape category is somewhat artificial but refers to extensive wetland systems where old willow trees line drains and riverbanks, providing landscape-scale habitat for the beetle. The trees tend to be open-grown. Hedgerow systems effectively provide similar habitat, with oak rather than willow.

Interestingly, where the beetle is found in conventional woodland situations, it tends to be in the open sunny areas. This can include the standard oak trees opened up through active coppice-cutting, or ride-side trees, and most commonly on boundary trees. In many cases the ‘woodland’ is actually secondary in-fill of an ancient wood pasture system, as at Beech Wood (SE5982) on the Duncombe Park Estate in North Yorkshire.

CHANGING STATUS

Lane, Wight & Forsythe (2002) comment that it has only recently been discovered in Warwickshire, and that it is becoming increasingly frequent in the county. The reliability of this anecdotal information is difficult to assess. The species has clearly been overlooked in the county and once noticed, becomes more noticeable. Does this indicate a real increase or expansion? The beetle was first discovered in Yorkshire in 1965 but is now known to be relatively widespread, and especially so in the low lying bogs and marshes of the Humber floodplain (R. J. Marsh, pers. comm.). Fowler (1891) says “very local, but occasionally found in numbers where it occurs”. This appears to be as true a statement today as it was then. The conservation status given by Hyman (1992) is widely acknowledged to have been marginal at the time and has

subsequently been shown not to have been the case – it is currently known from just over 100 10km squares (Fig. 1).

CONSERVATION ASPECTS

Although not warranting special species conservation status, *E. agricola* is a significant species ecologically and tends to be associated with the richer sites for saproxylic invertebrates generally. It remains a useful indicator species (Alexander, 2004) and especially as part of an assemblage of such species. It is relatively easy to detect on demand, which makes it useful for showing to landowners and site managers, and although by no means a charismatic species, its ecological relationships with the host fungus and the broad-leaved trees which support it provide a valuable illustration of conservation issues.

The veteran trees which have been colonized by the polypore *L. sulphureus* are also very vulnerable to felling. The presence of heartwood decay fungi should not be used as an indication of failing tree health – this is not the case – or structural weakness – expert arboricultural opinion is required to assess this, and yet it is commonly the case that bracket fungi are assumed to indicate a hazardous tree and the host tree all too often felled out of ignorance. Society also tends to favour the ‘perfect’ specimen and to destroy any imperfection, and veteran trees are often lost due to such misguided aesthetic considerations. There is no doubt that any species which requires veteran trees – and especially populations of veteran trees – is under threat in the modern countryside. Just because a species does not have a conservation status does not mean that it should be ignored in site assessment or conservation plans.

ACKNOWLEDGEMENTS

Thanks to Ian McClenaghan, Colin Johnson and Bob Marsh for help with tracking down some details; to Scotty Dodd and Jonty Denton for providing the distribution map from the Tenebrionoidea Recording Scheme data; also to Peter Hammond for discussion of some aspects.

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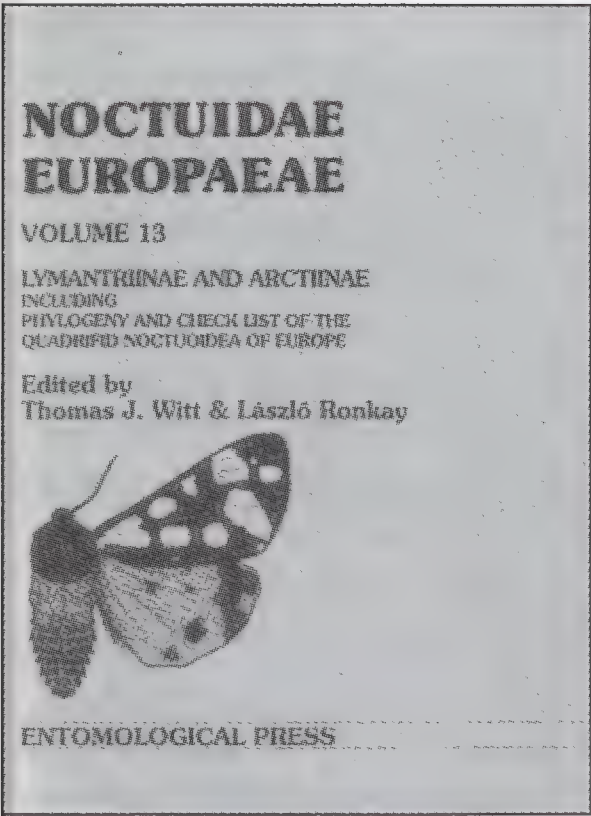
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BOOK REVIEW



Noctuidae Europaeae Volume 13, Lymantriinae and Arctiinae, including Phylogeny and Check list of the quadrifid Noctuoidea of Europe. Edited by Thomas J. Witt & László Ronkay. Entomological Press Sorø 2011. Hardback, 448pp, 20 colour plates. £186.00. ISBN 978-87-89430-18-8.

Noctuidae Europaea is the brainchild and master work of the late Michael Fibiger, and stands as a fitting memorial to that gifted entomologist and editor-in-chief of this monumental work which is now completed with the publication of the current volume. The thirteen volumes amount to some 4,819 pages and include 170 colour plates and 1,193 pages of black and white genitalia plates. The first five volumes were written in both English and French; since then all volumes are in English. All known European species of Noctuidae, *sensu lato*, are dealt with in detail.

In some ways this volume is a break from its predecessors in that it is the first in which the colour plates have not been prepared and photographed by David Wilson and the English text has not been reviewed by Barry Goater. It also deals with two subfamilies of Erebidae which in 1990, when the first volume was published, would have been considered families in their own right, and not part of Noctuidae in any sense of the word. The plates here, which, with one exception, are the work of Gábor Ronkay, compare well with the consistently high quality achieved by David Wilson in the past. These are fine, crisp images of set specimens, perhaps slightly too crowded, but of excellent quality. David has contributed a fine cover drawing as in all previous volumes.

Barry Goater is credited with linguistic correction, but he is at pains to stress that he, in fact, had no part in this book's production. Perhaps because of this there are examples of unusual English construction, which jar slightly to a native English speaker, although they never hinder the understanding of the sense of a sentence. I am left in awe of the authors, who come from several European countries, but who have all written so well in a language that is not native to them.

Over the 22 years during which the series has been produced there have been huge changes in our understanding of the phylogeny of Noctuidae, and this series, by promoting and enthusing the study of this group, has contributed in no small way to this leap forward. A chapter giving a potted history of these developments and a phylogenetic overview of Noctuidae makes fascinating reading. This is followed by a comprehensive checklist of the Quadrid Noctuoidea of Europe. It is explained that the Noctuoidea are divided into two groups, those with three veins arising from the forewing cell such as the Notodontidae which are not dealt with here, and those with four veins arising from the forewing cell, which are. The hind wing cell is then a factor, and those species with four veins arising are the Erebidae which now include the two subfamilies dealt with in this volume, and those with three veins are the Noctuidae *sensu stricto*. There are in fact four noctuid families, Nolidae, Erebidae, Euteliidae and Noctuidae. This arrangement may seem alien to many English lepidopterists and the authors admit there is still controversy, but the "four families" approach is now widely supported and backed up with both morphological research and DNA sequencing.

This leads us to the next part of the book which is an in depth examination of the Lymantriinae and Arctiinae. The species descriptions follow the established format of previous volumes with, as headings, Taxonomic Notes, Diagnosis, Bionomics and Distribution for each taxon. There is a full synonymy, a distribution map, coloured images of many examples of each species, for example fifteen *Phragmatobia fuliginosa*, all with full data, and genitalia photographs of both male and female. There is an additional plate showing living examples and typical habitats. Following a comprehensive literature section for these two groups there is a cumulative index of taxon names for the whole series. The series has sometimes been dogged by small editorial slips, perhaps as a result of the speed with which volumes have been published, and this work is no exception. For example the text and distribution map for *Arctia subnebulosa tundrana* are at odds.

In preparing the species discussions, revision of certain genera has been undertaken which has resulted in several taxonomic and nomenclatural changes as well as the description of a new tiger moth. There are 40 changes altogether which is surprising in such well known groups. As a result of reading this section I have personally discovered a species in my collection that I had failed to recognise earlier!

To sum up, the whole series has been indispensable to anyone with an interest in Noctuidae, whether in Britain, Europe or the World and this final volume is no less important. Many people are interested in tiger moths and tussock moths and will want to read this book to understand their revised status as well as for the authoritative text and wonderful plates. It does not come cheap at about £180–£190, but you only live once.

TONY PICKLES

**THE SALE OF LEPIDOPTERA IN BRITAIN:
A REVIEW OF CURRENT LEGISLATION CONCERNING THE SALE
WITHIN BRITAIN OF PROTECTED SPECIES OF EUROPEAN
MACROLEPIDOPTERA**

M. S. HARVEY

*36, Groveside, Great Bookham, Surrey, KT23 4LD
mikesharvey@tiscali.co.uk*

INTRODUCTION

Considerable confusion appears to exist amongst most entomologists as to where in Europe one is allowed to collect, what species, if any, are protected and whether permits or similar permissions are required. Also, it is unclear what paperwork is required in order to legitimise specimens of protected species whilst in the possession of the collector, irrespective of who collected them, and what needs to be done prior to their disposal or sale. Of course some people will ignore the problem and hope that it will all go away, however this may well ultimately place the executor of an estate in a difficult position and possibly open to prosecution. In addition, prior to the acceptance of collections by museums, proof may be required to show that specimens have been collected or acquired legitimately. In the absence of this proof they may not be able to accept specimens, thus depriving all of a significant source of data.

GENERAL POINTS

This review relates only to legislation specifically in connection with the act of sale of specimens of protected species as listed in British, European Union or international legislation and which require a licence to sell in Britain. This review applies to sale within Britain, which excludes the Isle of Man and the Channel Islands, which are Crown Dependencies.

In Britain the transfer of ownership of protected species by any means (sale, barter, exchange or gift) is covered by legislation, so any transfer of individual specimens and/or complete collections is subject to the relevant sale provisions. The possession, as opposed to the act of selling, of protected species is deemed lawful provided that the date of collection from the wild precedes the date of enactment of any applicable legislation; after this date the licensing requirements for selling protected species apply.

The current licensing authority for sale of specimens in England is Natural England, Scottish Natural Heritage in Scotland or the Countryside Council for Wales in Wales (see list of websites at the end of this review).

THE LEGISLATION

Three separate pieces of legislation need to be taken into account namely, in Britain The Wildlife and Countryside Act (1981) (as amended), in the European Union The Habitats and Species Directive (1994) and The Convention on International Trade in Endangered Species (CITES) (1977).

The Wildlife and Countryside Act (1981) is the principal British conservation legislation listing protected species, the operative date is 30 October 1981. The Joint Nature Conservation Committee (JNCC) is the government agency which is required by the Secretary of State to review Schedules 5 and 8 of the 1981 Act every five years,

a process referred to as the Quinquennial Review. The Fifth Quinquennial Review has now been completed for England, having started in 2008. Decisions are currently awaited in Scotland, the consultation process having commenced in 2011. The Sixth Quinquennial Review starts in 2012.

Schedule 5 of the Act lists protected animals, via the provisions of **Section 9** summarised below.

Part 1 intentional killing, injuring; taking

Part 2 possession or control (live or dead animal, part or derivative)

Part 4(a) damage to, destruction of, obstruction of access to any structure or place used by a scheduled animal for shelter or protection

Part 4(b) disturbance of animal occupying such structure or place

Part 5(a) selling, offering for sale, possessing or transporting for the purpose of sale (live or dead animal, part or derivative)

Part 5 (b) advertising for buying or selling such things

In this Review we are concerned specifically with Section 9(5).

Table 1 lists those Lepidoptera which are (or have been) included on Schedule 5.

Class Licence WML-CL07

In January 2011 a new Class Licence WML-CL07 was introduced. This covers the sale of all Schedule 5 species either fully protected, or listed for sale taken from the wild prior to the operative date of 30 October 1981. This is not species specific but merely registers that the licensed individual possesses Schedule 5 species which may be legally sold. A Class Licence is not actually issued, instead the applicant is entered onto a Register and is required to comply with certain stated conditions.

A Class Licence applies to all Schedule 5 species **irrespective of where they were captured**, thus it not only applies to listed species captured within Britain but also anywhere else, in or outside the European Union. There is no charge for a Class Licence which is currently valid until December 2032, and is issued by Natural England.

Individual Licence WML-A38

After 30 October 1981 protected species on Schedule 5 and taken from the wild in Britain, the EU, or elsewhere require an Individual Licence for sale in Britain via licence Form WML-A38, again obtainable from Natural England. There is no charge for the WML-A38 individual licence, however it is currently valid for only twelve months.

Fully protected Schedule 5 species captured in Britain cannot of course be sold, however, fully protected species taken in countries outside Britain where they are **not** protected can, *e.g.* Swallowtail *Papilio machaon* L., but still require a WML-A38 licence if sold in Britain. All species designated for sale only also require an individual licence if taken from the wild after 30 October 1981.

For example, Adonis Blue *Lysandra bellargus* (Rottemburg) was added to Schedule 5, for sale only under Section 9(5) in 1989. If captured prior to 30 October 1981 it would be covered by the WML-CL07 Class Licence. If captured after October 1981 an application for sale using the individual WML-A38 licence is required. If captured before 30 October 1981 it can of course be sold without requiring a licence.

Thus when the application for a WML-A38 licence is made, the status of the species at that time needs to be verified by checking for any amendments to the list of

Table 1. Legal status of British Lepidoptera currently or formerly protected by the Wildlife & Countryside Act (1981) and subsequent amending legislation.

Scientific name	English name	Sections of Act cited where full protection is not afforded	Year scheduled
Butterflies			
<i>Apatura iris</i>	Purple Emperor	Sale only S.9(5)	1989
<i>Argynnis adippe</i>	High Brown Fritillary	Sale only S.9(5)	1981
		Full protection	1992
<i>Aricia artaxerxes</i>	Northern Brown Argus	Sale only S.9(5)	1989
<i>Boloria euphrosyne</i>	Pearl-bordered Fritillary	Sale only S.9(5)	1989
<i>Carterocephalus palaemon</i>	Chequered Skipper	Full protection	1981
		Sale only S.9(5)	1989
<i>Coenonympha tullia</i>	Large Heath	Sale only S.9(5)	1989
<i>Cupido minimus</i>	Small Blue	Sale only S.9(5)	1989
<i>Erebia epiphron</i>	Mountain Ringlet	Sale only S.9(5)	1989
<i>Eurodryas aurinia</i>	Marsh Fritillary	Sale only S.9(5)	1989
		Full protection	1998
<i>Hamearis lucina</i>	Duke of Burgundy	Sale only S.9(5)	1989
<i>Hesperia comma</i>	Silver-spotted Skipper	Sale only S.9(5)	1989
<i>Leptidea sinapis</i>	Wood White	Sale only S.9(5)	1989
<i>Lycaena dispar</i>	Large Copper	Sale only S.9(5)	1989
		Full protection	1998
<i>Lysandra bellargus</i>	Adonis Blue	Sale only S.9(5)	1989
<i>Lysandra coridon</i>	Chalkhill Blue	Sale only S.9(5)	1989
<i>Maculinea arion</i>	Large Blue	Full protection	1981
<i>Melitaea cinxia</i>	Glanville Fritillary	Sale only S.9(5)	1989
<i>Melicta athalia</i>	Heath Fritillary	Full protection	1981
<i>Nymphalis polychloros</i>	Large Tortoiseshell	Sale only S.9(5)	1989
<i>Papilio machaon</i>	Swallowtail	Full protection	1981
<i>Plebejus argus</i>	Silver-studded Blue	Sale only S.9(5)	1989
<i>Strymonidia pruni</i>	Black Hairstreak	Sale only S.9(5)	1989
<i>Strymonidia w-album</i>	White-letter Hairstreak	Sale only S.9(5)	1989
<i>Thecla betulae</i>	Brown Hairstreak	Sale only S.9(5)	1989
<i>Thymelicus acteon</i>	Lulworth Skipper	Sale only S.9(5)	1989
Moths			
<i>Acosmetia caliginosa</i>	Reddish Buff	Full protection	1981
<i>Bembecia chrysidiformis</i>	Fiery Clearwing	Full protection	1998
<i>Gortyna borelii</i>	Fisher's Estuarine	Full protection	1998
<i>Hadena irregularis</i>	Viper's Bugloss	Full protection	1988
		Removed, believed extinct	1998
<i>Pareulype berberata</i>	Barberry Carpet	Full protection	1981
<i>Siona lineata</i>	Black-veined	Full protection	1981
<i>Thalera fimbrialis</i>	Sussex Emerald	Full protection	1992
<i>Thetidia smaragdaria</i>	Essex Emerald	Full protection	1981
		Removed, believed extinct	2011
<i>Zygaena viciae</i>	New Forest Burnet	Full protection	1981
<i>Zygaena lonicerae</i>	Narrow-bordered Five-spot (Talisker) Burnet	Sale only S.9(5)	2011
<i>jocelynae</i>		England only	
<i>Zygaena loti scotica</i>	Slender Scotch Burnet	Sale only S.9(5)	2011
		England only	

Schedule 5 species. Any additional species will be covered by the Class Licence if collected before 31 October 1981 and by an Individual Licence if scheduled for sale thereafter.

The Conservation of Natural Habitats and of Wild Fauna and Flora (Council Directive 92/43/EEC dated 21 May 1992), otherwise known as the Habitats and Species Directive, is the conservation legislation covering all twenty-seven member states currently comprising the European Union. Together with the Birds Directive, this forms the basis of Europe's nature conservation policy built around two pillars, the Natura 2000 network of protected sites and a strict system of species protection. The Directive protects over one thousand animal and plant species and over two hundred habitat types which are considered of European importance.

The operative date is 10 June 1994 for States which acceded to the EU before that date namely Belgium, Germany, Ireland, Greece, Spain, France, Italy, Luxembourg, Netherlands, Portugal, United Kingdom and Denmark or the actual date when the individual country joined the EU, namely Austria, Finland, and Sweden on 1 January 1995, Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia on 1 January 2004 and Bulgaria and Romania on 1 January 2007.

Annex IV(a) of the Directive lists protected species of invertebrates of which there are 41 Lepidoptera species, comprising 25 butterflies and sixteen moths, together with other invertebrate taxa, see Phillips (2008) and Anon (2008).

There are only three species that also appear on the Wildlife & Countryside Act (1981) Schedule 5 namely, Large Blue *Maculinea* (now *Phengaris*) *arion* (L.), Large Copper *Lycaena dispar* (Haworth) and Fisher's Estuarine Moth *Gortyna borelli lunata* (Freyer).

EU legislation differs specifically from that enacted in Britain in that a licence is also required to **possess** a European protected species or a derivative as listed in Annex IV(a) of the Directive unless lawfully taken from the wild prior to the 10 June 1994, or later European Union accession date. A European protected species captured outside the European Union is not covered by the legislation.

Individual Licence WML-A37

Applications to possess or transport listed European protected species and to sell them within Britain after the operative date require an Individual Licence WML-A37 obtainable from the Natural England Wildlife Licensing Unit (no fee).

Basically it would seem that it was lawful to collect and to sell subsequently in Britain Annex IV(a) listed European protected species without a licence from Natural England if collected before 10 June 1994, but after this date a licence is required. However on what basis Natural England can, or are prepared to, grant permission to collect/possess/sell a scheduled protected species from Europe is open to question and seems unlikely. None of the three species mentioned above may be collected after 10 June 1994 in the European Union but presumably if collected outside the European Union after that date may be sold with a licence.

Under the Conservation of Habitats and Species Regulations 2010, Natural England under powers conferred by the Secretary of State, has authority to issue licences for **possession** for the following purposes:

- (i) Scientific purposes
- (ii) Educational purposes
- (iii) Conserving wild animals or wild plants or introducing them to particular areas.

(iv) Possession under strictly supervised conditions, on a selective basis and to a limited extent.

Provided that there is no satisfactory alternative and this action will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status. It will be noted that the above makes no reference to sale and would seem to make no provision for possessing specimens retained in a private collection.

International: Convention on International Trade in Endangered Species (CITES)

Appendix 1 under Article 10 of the CITES Regulations 1977 is solely responsible for monitoring the **trade** in endangered species **not mere possession**. Only two European butterfly species are listed under Article 10, neither of which are found in Britain but are found elsewhere in Europe namely Corsican Swallowtail *Papilio hospiton* Gén  and Apollo *Parnassius apollo* L. both of which appear on the EU Habitats Directive protected list; thus it is illegal to take either species from the wild after 10 June 1994 or later European Union accession date within the European Union.

A CITES WLRS trade certificate obtained via the Animal Health and Veterinary Laboratories Agency (AHVLA) is required in order to sell the two listed butterflies. The cost of the CITES licence is £25 per species (not specimen) with no expiry date other than the death of the licence holder or prior sale of the specimen(s). On sale the Vendor’s Certificates need to be returned to the Authority and a new licence obtained in the name of the purchaser.

General Considerations

Captive Bred Stock

Standard guidance issued by Natural England in respect of captive bred specimens as at February 2011 (no reference or form number) is as follows:

A licence is not required to sell (or possess) captive bred or captive reared specimens of animals protected under Schedule 5 of the Wildlife & Countryside Act, European protected species listed on Schedule 2 of The Conservation of Habitats and Species Regulations 2010 or other Annex IV(a) species listed in the Habitats Directive. However it is reasonable to conclude that an animal produced as a result of a fertile egg taken from the wild and hatched in controlled (captive) environment to have been taken from the wild and considered a wild specimen. Likewise it is reasonable to conclude that the offspring of a gravid (being with young or pregnant) animal taken from the wild and born in a controlled environment to be taken from the wild.

Whilst it is likely that an animal conceived and born in a controlled environment would be considered captive bred, there is a presumption that an animal has been taken from the wild **unless it can be proved otherwise**. It would seem that unless one has the original provenance of a specimen taken from the wild, together with full details of breeding through subsequent generations, it is virtually impossible to prove that a specimen has **not** been taken from the wild.

Data Labels

It is initially assumed that all specimens under consideration carry full data labels, which detail the exact date and place of capture, possibly captor together with any other relevant information such as stage, bred etc. However in many cases the information is very sparse or entirely lacking with no data label at all. In this case the

burden of proof is effectively left with the possessor/vendor. Contrary to most legislation, **reverse burden of proof** applies, and it is up to the possessor/vendor to prove that the specimen was collected legally. If a cabinet together with the specimens contained was purchased before 30 October 1981 and this can be verified by a sales invoice this will act as proof, failing this a sworn Statutory Declaration may provide the necessary protection.

Disclaimer

Whilst every effort has been made to confirm the accuracy and validity of the content of the current legislation as outlined in this review, including statements and guidance given, it must be stressed that this is the interpretation of the author. Ultimate responsibility rests with the individual concerned to ensure that the legislation has been correctly interpreted and the law is complied with in his or her particular circumstances.

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Websites and contact points for licences

Defra: www.defra.gov.uk

Countryside Council for Wales: www.ccw.gov.uk

Natural England: www.naturalengland.org.uk

Scottish Natural Heritage: www.snh.gov.uk

Joint Nature Conservation Committee: www.jncc.defra.gov.uk

Wildlife & Countryside Act (1981) schedules and amending Statutory Instruments: www.legislation.gov.uk/all?title=Wildlife%20and%20Countryside%20Act%20

Wildlife & Countryside Act (1981) sale licences for England: Wildlife Licensing Unit, Natural England, First Floor, Temple Quay House, 2 The Square, Bristol BS1 6EB. Telephone: 0845 601 4523 (local rate). E-mail: wildlife.scicons@naturalengland.org.uk

CITES licences: Animal Health and Veterinary Laboratories Agency (AHVLA), Specialist Service Centre – Wildlife Licensing and Registration Service, 1/17 Temple Quay House, 2 The Square, Temple Quay, Bristol BS1 6EB. Telephone: 0117 372 8774. E-mail: wildlife.licensing@ahvla.gsi.gov.uk

A CHANGE IN FUNDING DIRECTIONS: IMPLICATIONS FOR BIOLOGICAL RECORDING

ROGER MORRIS

7 Vine Street, Stamford, Lincolnshire PE9 1QE
roger.morris@dsl.pipex.com

INTRODUCTION

Developing Government approaches to wildlife conservation clearly show how funding priorities are changing. Such changes are not unfamiliar, as a similar situation occurred in the 1990s following the dismembering of the Nature Conservancy Council (NCC). The period from 1991 to around 1998 involved a substantial reduction in the numbers of staff employed in English Nature and resulted in significant changes in the ways in which entomological recording and statutory nature conservation bodies interacted. Some of this has undoubtedly influenced the development of voluntary recording effort in the following 20 years.

Not all of the changes have been detrimental and in some ways it might be argued that recording effort has actually gained in strength rather than declined. For example, the NBN Gateway now contains nearly 70 million records across all plant and animal taxa. However, the reasons for improvement may not be wholly associated with the policy shift. Technology has changed: personal computers and databases are much more readily available; the internet has created a completely new and cheap publishing and networking medium, and printing costs have effectively dropped so that private publications are more commercially viable. Various groups of entomologists have formed societies and local groups that did not exist twenty years ago.

Entomologists in the Nature Conservancy Council (NCC) were significant contributors to the organisation and promotion of British entomology between 1981 and 1991. The Invertebrate Site Register employed a core team of four permanent staff and a bigger group of staff on casual or fixed-term contracts (up to 11), all of whom were actively involved in promoting recording effort or interacting with leading non-vocational invertebrate specialists. County reports were compiled on the basis of data supplied by the most active entomologists of the time, and field meetings were run to promote recording effort. In addition, there was a team of three entomologists within the England Field Unit who were actively engaged in surveys of SSSIs, with others in Scotland undertaking similar studies.

In 1991 entomology lost ground, with staff either being re-deployed, made redundant or not having contracts renewed. A residual team of three entomologists remained in England, with further single posts in Wales and Scotland. This decline was accompanied by downgrading of the grade of staff employed, with just one Senior Scientific Officer equivalent. Changes to grading meant that entomology, which had previously been represented by a 'Grade 7', no longer had a senior champion whose judgement had a bearing on organisational policy.

These changes also led to a seismic shift in the capacity to engage with the voluntary sector and meant that the relationship with field entomologists largely ended. It also meant that invertebrate taxa had a much lower profile within the Country Agencies despite the relative contribution that invertebrates make to UK biodiversity; just at a time when the term biodiversity entered the lexicon and became an industry in its own right!

A DEVELOPING NEW ORDER

The evolution of Diptera (true flies) recording offers an insight into subsequent changes in direction by some entomologists after the breakup of the Nature Conservancy Council. It is not wholly representative but it does provide analogues that may be significant in the current climate of cuts in environmental posts, and in particular natural history curators in regional museums.

Prior to 1991 British non-vocational Dipterology revolved around the Nature Conservancy Council but this link was severed when Alan Stubbs retired and Ian McLean was re-deployed onto non-entomological work. In addition, the relationship with the Biological Records Centre at Monks Wood was made more difficult as their resources for computerising data diminished. A new organisation was established: Dipterists Forum, which at the time had a membership of between 250 and 275 and now boasts more than 400 members. Its purpose was to provide the focus for British Dipterists and to develop new ways of delivering what had previously been provided via the NCC team.

Dipterists Forum, and its predecessor the Central Panel of Diptera Recording Schemes, has a long history of running field meetings that focus on recording from parts of the country where Diptera data are deficient. These meetings were originally organised by Alan Stubbs and Ian McLean and were aimed partly at biological recording and partly at training. Once Alan and Ian were no longer available to act as co-ordinators and organisers, a new means of organisation had to be established. Over the following seven years various members of the Forum who remained within the Country Agencies organised the summer field meeting. This was not tenable in the longer term however, as organisational priorities focused increasingly on administrative duties and new legislation such as the Habitats Regulations; and of course the newly emerging biodiversity industry.

THE PHOENIX RISES

Dipterists Forum has benefitted from the development of a broader core of contributors to its organisation and activities. In the 20 years since the break-up of the Nature Conservancy Council the Forum has played an increasingly important role in the promotion of field recording and in giving impetus to recording schemes. It has done so in many ways, most notably:

Running annual master classes in difficult taxa at Preston Montford. These are immensely popular and attract as many as 35 participants.

Running a variety of field meetings (Figs. 1 & 2). At the moment a minimum of three residential meetings are organised each year with occasional additional meetings where the opportunity arises. Participation is extremely high with numbers being maintained (Spring [20+ participants]; Summer [28–30 participants]; Autumn [10 participants]).

Assembling data from past field meetings. The Forum now has a database with over 80,000 records specifically arising from field meetings organised in the past fifteen years. In addition, data from the last 40 years meetings can be found within datasets for all of the recording schemes.

An outreach programme for training new dipterists that has travelled to the furthest extremities of the British Isles (Morris & Ball, 2012) (Fig. 3).

A 'Bulletin' containing relevant news and field meeting reports together with the newsletters of the active recording schemes.

A journal, *Dipterists Digest*, which has two issues yearly and publishes many of the important announcements of species new to Britain and Europe as well as ecological studies.



Fig. 1. Members of Dipterists Forum at Shapwich Heath, Somerset in 2010.



Fig. 2. The start of a Dipterists Forum meeting at Windsor Great Park in 2010. This meeting attracted a substantial number of new people because it was a rare opportunity to visit this spectacular site.



Fig. 3. Stuart Ball and Rob Wolton at FSC Preston Montford in 2009. Training events here form a component of the Birmingham University Masters in Biological Recording.

Would this sort of progress have been made without the jolt given by the breakup of the NCC? We will never know, but one must suspect it would not because there would be less reason to innovate. Consequently from this very narrow perspective, it might be argued that the breakup of the NCC precipitated a new paradigm in dipterological recording. Today, the Forum is vibrant and its committee has attracted a rich assemblage of new people from a wide variety of backgrounds.

There is, however, a sting in the tail. Many of the key 'shakers and movers' in Dipterists Forum were former NCC employees: the current Chairman, Vice-Chairman, Conservation Officer and Field Meetings Secretary all originated from the Nature Conservancy Council. Nobody from the Country Agencies now participates in the running of the Forum and only one of the Country Agency entomologists regularly attends field meetings. In truth, the Forum probably would not have survived without the original cohort of NCC staff who believed that there was a continuing need to promote the study of flies and their conservation.

Importantly, having weathered a difficult period, the Forum has now established an ethos and *modus-operandi* that stands a good chance of surviving as long as new people with similar enthusiasm and drive can be recruited. The Forum's outreach programme will hopefully generate that new cohort and it is encouraging to see good numbers of under 35s attending training that was once populated largely by a more senior generation.

NEW CHALLENGES

There are clear indications that Government thinking looks towards making greater use of volunteers (e.g. Mackechnie *et al.*, 2011). This is happening at the same time as contractions in funding for environmental sciences pose a potentially more serious challenge for biological recording than ever occurred in the 1990s.

Although not in doubt at the moment, the future of the Centre for Ecology and Hydrology and in particular the Biological Records Centre (BRC) is a critical issue for organizations such as Dipterists Forum. For example, it would not have been possible to publish the most recent hoverfly atlas (Ball *et al.*, 2011) without BRC. Experience has shown that unless there are tangible reasons for recorders submitting records, and an enthusiastic recording scheme, interest and commitment wanes (Morris & Ball, in prep). The publication of an atlas and its distribution to the main contributors by BRC is a very welcome and necessary contribution to ongoing recording activity.

Recent announcements of job losses in museums have a potentially serious impact on biological recording for three reasons. Firstly, the museums provide a local source of voucher specimens that can be used to aid identifications by biological recorders (Boxshall & Self, 2011). In the past they have employed taxonomically competent field naturalists who have contributed to the development of many other taxonomically competent naturalists. Finally, they provide a focus for community engagement (from a personal perspective, the encouragement and help I received from Eric Philp at Maidstone Museum remains one of the high points in my formative years). The latter is especially significant because many of the Dipterists Forum outreach events are run at museums such as the Natural History Museum, Bristol City Museum, Cardiff Museum and the Hunterian Museum (University of Glasgow). Without the enthusiasm and support of the curators, meetings at Bristol, Carlisle and Norwich scheduled or under consideration for winter 2012–13 would not be possible.

It is also worth bearing in mind that much of the impetus for the advances over the past 20 years arose because employment helped to develop expertise, contacts and enthusiasm amongst technical specialists. Such jobs are even scarcer than they were 25 years ago and consequently opportunities to develop new people with the right blend of knowledge and enthusiasm will be reduced. This in turn reduces scope for motivating a broader cohort of field biologists whose data help Government to develop wildlife policy (Boxshall & Self, 2011) and its agencies to report on wildlife assets in accordance with their national and international obligations. Difficulty finding work is also likely to be a disincentive for young entomologists to doggedly pursue their interest in the hope of finding employment in the way that many of the 1980's NCC cohort did.

The growth of environmental consultancies over the past twenty years might be seen as a positive opportunity for growing new taxonomically competent entomologists, but there is very little evidence for this. Most of the entomological expertise is still provided by specialists who started their careers in the Nature Conservancy Council, local museums or with the National Trust's survey team. None of these vehicles for skill development are now available and the main focus for ecological careers now focuses on a very narrow spectrum of protected species. There is therefore a developing age gap and likely skills crisis that will become increasingly acute as existing specialists retire or reduce their workloads.

These changing demographics are also present amongst volunteer recorders. In a recent analysis, Morris & Ball (in prep) found that out of the 128 major contributors to the Hoverfly Recording Scheme since 2000 (i.e. contributing 1,000 or more records), 83 had started contributing 30 or more years ago and of these 12 had ceased to contribute in the past ten years owing to age and infirmity. The data point to an ongoing decline in recruitment and an ageing population. This is significant because British dipterological recording contributes roughly a third of the data on Diptera held by GBIF (the Global Biodiversity Information Facility) and the Hoverfly Recording Scheme forms the bulk of British Diptera records.

The same analysis also highlighted the age structure in other important recording schemes such as craneflies and fungus gnats which are highly sensitive to environmental

change and in particular drought. Both recording scheme organizers are above retirement age and there are few indications of a new cohort with similar interests and technical abilities following. These groups may well become highly significant in future as changes in hydrology and mycology can have profound effects on wider biodiversity and they would be good indicators for monitoring such changes.

The issue of taxonomic competence becomes more acute when one considers the outputs of universities whose focus has drifted away from taxonomy-based studies. Dipterists Forum has found that MSc and PhD students frequently attend its courses to meet needs that have not been fulfilled elsewhere (several curators at the Natural History Museum have also attended Dipterists Forum introductory courses as well as 'master classes').

In recent years the Birmingham University Masters and Certification courses in Biological Recording have helped to fill this gap. Hoverfly identification courses regularly attract interest from these students and this provides a way of drawing new blood into Dipterists Forum activities. We have recently learned, however, that these courses are to be discontinued as Birmingham University focuses more critically on subjects that attract research money. That can only mean a further diminution of technical competency for biological recording if the decision is not reversed or resolved by the courses finding new homes in another suitable university.

In addition to the technical process of developing new specialists, there is also an increasing belief that photography can replace retention of specimens. This has the potential for a corrosive effect on biological recording as more recorders resort to a photograph as a voucher. Media such as iSpot provide an excellent way of encouraging casual recording but the records generated largely involve the bigger and more readily identified species. This is illustrated by data for hoverflies abstracted from a variety of websites (Figure 4) in which it can be seen that a very limited suite of species forms the majority of records. This presents policy-makers with an additional problem: how to make sure that the full breadth of taxa are properly monitored?

AN UNFOLDING CRISIS

During recessions decisions are taken that involve relatively little short-term political pain. It may take some years before their impacts are fully felt, but there will come a time when the lack of investment in careers becomes apparent. This is especially true for technical skills such as entomology that take decades to develop. Government's promotion of 'the big society' has many attractive points because as we have seen there are circumstances in which new and vibrant initiatives may be stimulated. Unfortunately such initiatives will only happen if the basic foundations are present.

Traditional routes into biological recording are being lost whilst other media are becoming more popular. These changes are accompanied by a decline in taxonomic coverage (Morris, 2010) and this means that there will be less scope for Government to call on volunteer groups to underpin its conservation science. Taxa that are simple to identify do not necessarily provide an indication of overall health of the natural environment; fungus gnats and crane flies, for example, will not be suited to this sort of recording and yet they are often highly indicative of unusual environmental conditions. This suggests an impending demographic crisis that needs immediate attention if a gap in the datasets is to be avoided and capacity to train and mentor replacements is to be retained.

In their review of taxonomy in the UK Boxshall and Self (2011) highlighted the spread of capacity and competency in the UK, and changes in its demographics. They identified a variety of trends; not least a decline in the numbers of taxonomists in Universities and poor rates of replacement when they retired. The importance of

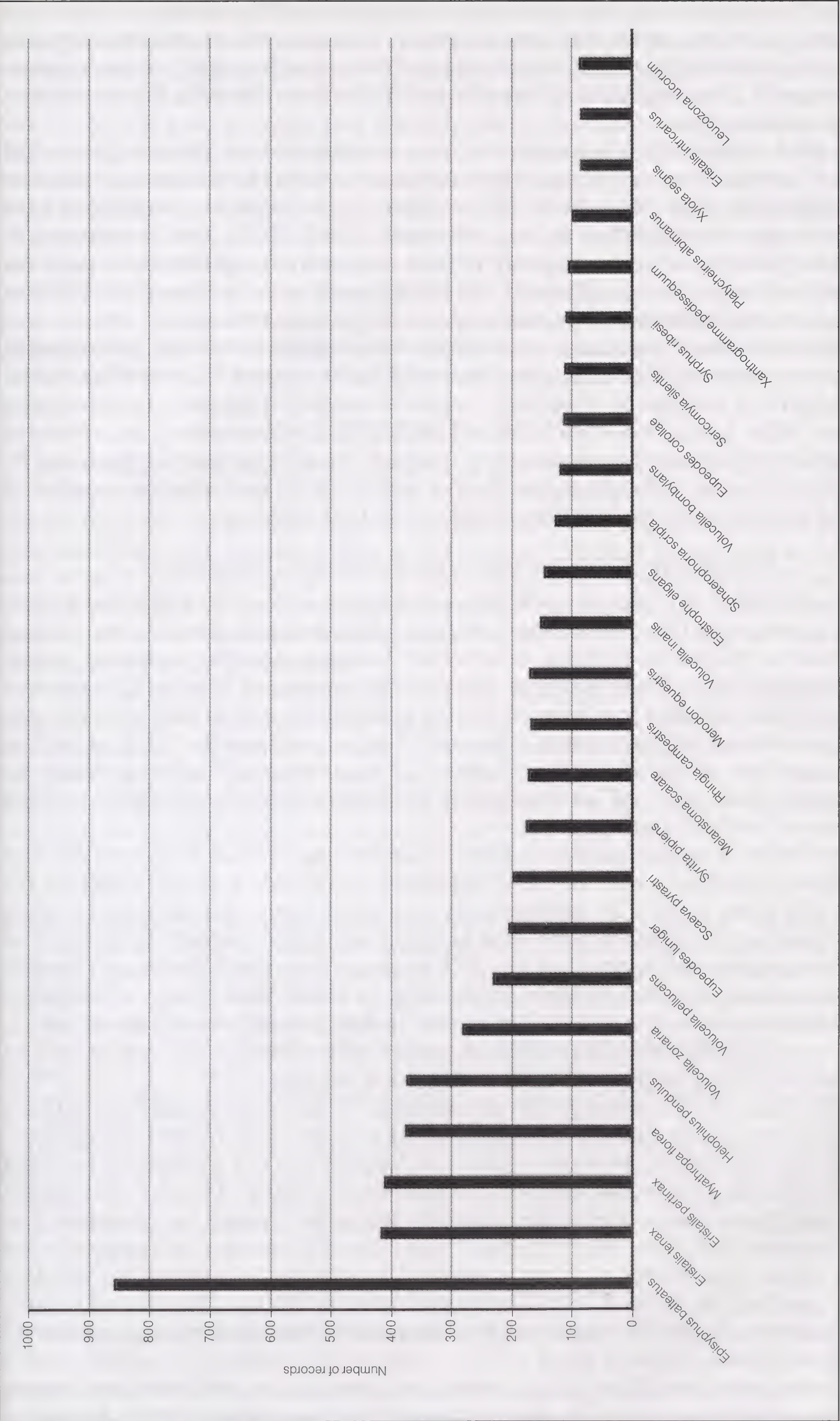


Fig. 4. The hoverfly species that form 80% (5447 records) of the data abstracted from photographs (6807 records) posted on websites from 2004 to 2012.

museums as sources of expertise and access to voucher specimens was also noteworthy. However, what did not emerge was the relative contributions of public sector and private sector to maintaining the skills base and providing encouragement to new recruits. It was primarily the public sector that grew the skills that the private sector now relies upon.

Dipterists Forum offers a model that may or may not be representative. The majority (but not all) of active recording scheme organizers and motivators appear to have originated from the public sector. Many private sector employees have insufficient time to report their findings (Boxshall & Self, 2011). This is noticeable in Dipterists Forum too, as the majority of data we get from consultants come from members who were once employed in the public sector who developed the ethos of biological recording before they entered the world of consultancy.

This raises a critical question for the private sector about the effort it is making to develop new capacity. We know from Boxshall & Self's review (2011) that the private sector reports a shortfall in taxonomic expertise needed to support its commercial activities. What has not emerged is any evidence of that sector making any efforts to address shortfalls (at least in entomology). Instead, the effort appears to be driven by the voluntary sector underpinned by former public sector staff who run courses at cost and often actually underwrite part of the costs themselves.

DEMONSTRATING THE VALUE OF BIOLOGICAL RECORDING

Data assembled by voluntary schemes are starting to play an important role in academic research. They are regularly used in commissioned research into topical issues such as pollinator declines, biodiversity loss and strategic studies of species population changes. These datasets are seen as important from a Government perspective because they can help to inform policy development and perhaps may help in monitoring of environmental health (often in contracts that go to academic institutions and commercial organisations). Yet, taxonomic training forms an increasingly small part of undergraduate environmental courses: such training generates no research funds.

The problem is compounded by a poor understanding of what it takes to develop taxonomic competency and why it is important to provide a career structure for people with these skills. This perception is reinforced when research teams publish papers based on recording scheme data but the people who provide the data are at best given an acknowledgement of the data source at the end of the paper. There is therefore a need for the academic community to think about ways of engaging positively with non-vocational data providers to find mutually beneficial outcomes. At the very least, the recording scheme organisers who assemble the data should be joint authors of any analysis using data they have compiled.

Recent measures to encourage the development of new field naturalists by Defra through a fund run by Natural England suggest that the value of field naturalists is starting to be recognised. However, it must be realised that this community is driven by very different reasons to those of professional ecologists. They are pursuing a hobby and therefore they are unlikely to be willing to be diverted into activities that do not resonate with their basic interests. Field naturalists are not an untapped seam of free labour who will take on environmental monitoring initiatives, but the data they do generate can be used to evaluate environmental change. The critical point is to ensure this data flow is maintained and enhanced rather than trying to divert the river where it does not want to go.

In this respect a paradigm shift is needed in relation to the credibility and respect afforded to field naturalists by the academic and commercial worlds. Biological

recording has been largely regarded as an ‘amateur’ pursuit; the term itself needs to be rebranded as ‘non-vocational’ because the term ‘amateur’ has unhelpful connotations of poor quality. Many non-vocational specialists make major contributions and exercise skills that complement those of academia. For example, one of the UK’s most competent hoverfly specialists drove a refuse lorry around Dorset until recently. In addition to contributing new species to the British list he has consistently contributed 1,000+ high quality records per year to the Hoverfly Recording Scheme database. Another important exemplar was the railway signaller whose work on hoverflies in South Yorkshire was an inspiration to a generation of enthusiasts in the Sorby area and who has lent his name to the ‘Brackenbury lure’; the use of cut hogweed or other flowers to attract hoverflies in an otherwise flowerless environment. Neither of these examples represent the analytical skills that are provided by universities, but both highlight skills that are now much less apparent in academia but remain important from a conservation and environmental monitoring perspective.

AND THE MORAL OF THE STORY . . .

The boundaries between professional and non-vocational expertise in biological recording are blurred. Many extremely competent taxonomists and field biologists operate on a non-vocational basis and provide data that are of recognised value to researchers and policy-makers. Part of the reason why there is currently strength in some of the most active groups of recorders stems from the historic employment of some ‘shakers and movers’, and any diminution in the source of such people must be expected to have long-term consequences for biological recording as well as for environmental impact assessment.

A new initiative is needed to help provide the platform for developing future generations of field naturalists who can combine taxonomic skills with the academic interest needed to promote, assemble and interpret major datasets. It needs to recognise the important role that careers play in the process, but perhaps more importantly there is a case for choosing people with the potential to inspire others; thereby making such appointments particularly cost-effective.

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SHORT COMMUNICATION

Mass movement of *Bombus terrestris* (L.) (Hymenoptera: Apidae) along the South Wales coastline: migration or irruption? – On 27.iii.2012 while counting migrating birds on the South Wales coast at Peterstone Gout, Gwent (51.51916°N, 3.04021°W) I observed a mass movement of *Bombus terrestris* (L.) queens. Bird observations

commenced at 07:23h and continued to 10:10h; by 08:40h I realised that a movement of *B. terrestris* was occurring and during the remaining 90 minutes, counted 45 individuals. The bees were approaching over the sea or along the coast, all moving directly North-East at heights between 5 and 50m; the only deviations from a linear flight path occurred when the insects were closely overtaken by migrating passerine birds (mostly chaffinches and meadow pipits) which were moving through the area in the same direction at the time. Weather conditions were: wind from North-East, Beaufort force 2; temperature, 6°C rising to 10°C; cloud, 1/8 octads. Two hours of observation from the same site on the following day logged only four bees, also moving North-East. On 26.iii.2012 Gareth Cooksley (pers. comm.) was line fishing from a boat ~2 km East-North-East of Lavernock Point (~51.4134°N, 3.1512°W), close to the South Wales coast approximately 16 km South-West of Peterstone Gout, and observed about 30 bees passing his boat, all flying “away from land” (implying a roughly easterly movement). Interestingly, Paul Bowyer (pers. comm.) was making systematic observations of migrating birds at Brean Down, Somerset during the same period and did not log any movements of bumblebees. Brean Down (51.3276°N, 3.0349°W) is ~23 km south of Peterstone Gout, on the south side of the Bristol Channel. It seems clear that from 26–28.iii.2012, a concerted eastwards or northeastwards movement of *B. terrestris* took place along the South Wales coast and that it probably did not involve any movements across the Bristol Channel.

Mass movements of bumblebees are little known in Britain, and confined to occasional anecdotal accounts of linear movements and reports of *B. terrestris* queens coming to lightships, well out to sea (David Goulson, pers. comm.). Migrations of bumble bees and wasps have been reported from vessels at sea in the eastern Baltic between Tallinn (Estonia) and Helsinki (Finland) (Mikkola, 1984) and Vepsäläinen & Savolainen (2000) have argued that the behaviour is irruptive rather than migratory, perhaps driven by influences of vole cyclicity on nest site availability or quality. Bumblebee movements have also been documented on the Dutch coast (Roos, 2012) where Mervyn Roos (pers. comm.) considers them to be an annual migration which is possibly overlooked (under favourable conditions with a tail wind, migration is strong but largely high-flying and hard to detect with the human eye whereas in unfavourable conditions, the insects fly lower, into the wind and are more easily seen).

Whether bumblebee movements are regular annual or seasonal migrations (‘true’ migration) or irregular irruptive events in response to supra-annual or irregular changes in the environment, the energetic costs of moving would have to be balanced against a benefit gained by better access to resources at the destination. Many factors might potentiate mass movement, including parasite load, competition amongst colony founding queens, availability of nest sites and predation pressure. For true migration to occur, these factors would have to change with regular annual or seasonal frequency whereas irruptive movements could be responsive to supra-annual or irregular changes in them. Further observations are needed to elucidate the extent and causes of mass movements of bumblebees. – ADRIAN R. PLANT, Department of Biodiversity & Systematic Biology, National Museum of Wales, Cathays Park, Cardiff CF10 3NP.

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2011 ANNUAL EXHIBITION

Imperial College, London SW7 – 5 November 2011

The following accounts of the exhibits were compiled by the recorders Aaron Jones (British Butterflies), Sean Clancy (British Macrolepidoptera), Richard Dickson (British Microlepidoptera), Norman Hall (Foreign Lepidoptera), Peter Chandler (Diptera), Peter Hodge (Coleoptera), Alan Stewart (Hemiptera), David Baldock (Hymenoptera) and John Badmin (General). Exhibitors should be aware that the recorders have an onerous task preparing the reports and it would help a great deal if they could include email addresses with their exhibit reports so that long accounts can be transferred electronically. This year Jon Cole kindly agreed to be the official photographer and it was pleasing to note that all the selected specimens were photographed as quickly as they could be and that no queues developed. The cost of printing the four colour plates was covered by a grant from the Hammond Memorial Fund.

The highlight of the day for many was the chance to buy a copy of Colin Hart's *British Plume Moths* which was officially launched at the exhibition. The book had only recently been checked and signed off for printing and published copies were available for the first time literally on the day. The author was very pleased to see his book on sale, and in true publishing tradition kindly agreed to sign copies for those who requested (Fig. 1).

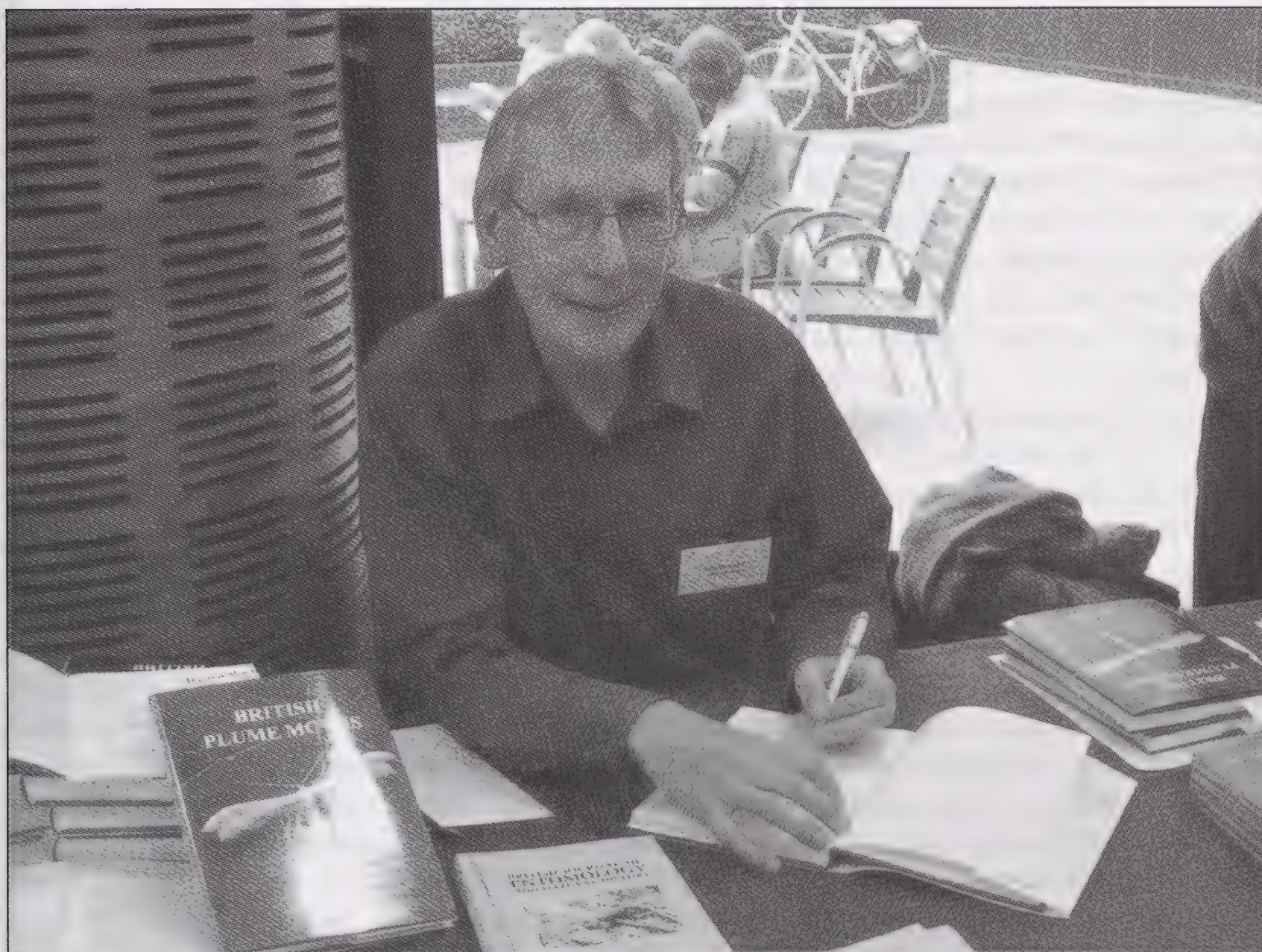


Fig. 1. Colin Hart signing copies of his latest book, *British Plume Moths*, at the 2011 Annual Exhibition. Photo: Derek Stimpson.

The Society's Annual Dinner was again held at the Strathmore Hotel, close to the Natural History Museum and a short walk from our exhibition venue. Members who brought along exhibits were able to leave them in a secure room so that they could relax and enjoy the meal. In all, thirty-six people sat down to a buffet style dinner. The sad news of course was that our convalescing President and his wife were unable to join in the festive occasion and we look forward to their return next year.

This occasion was also the last time that Mike Simmons acted as our Exhibition Secretary. He has held this post for the past 20 years and his efforts have ensured that Annual Exhibitions have run smoothly without any apparent technical problems. He was thanked for his services to the Society at the dinner, and we wish him every success in the future.

BRITISH BUTTERFLIES

BAILEY, K. E. J. – Results of breeding experiments during late 2010 and 2011. *Aglais urticae* (L.), extreme examples of ab. *conjuncta* Meuberg. (Plate 9, Fig 2) induced by cold and heat shocks to pupae in raised oxygen levels from wild larvae, Oxford May 2011. *Argynnis aglaja* (L.), unusually pale females arising from multi-heat shocked pupae from West Yorkshire stock. *Argynnis paphia* (L.), a series of cold-shock induced aberrations including several atypical melanics (Plate 9, Fig 5), all from a wild-taken f. *valesina* Esper ex Wiltshire and emerging May 2011. *Issoria lathonia* (L.), some strong aberrations (Plate 9, Fig 1a & 1b) from cold then heat shocked pupae in raised oxygen levels during November and December 2010, ex French stock. Similarly treated *Boloria euphrosyne* (L.), but showing less strong aberrant tendencies, bred April 2011, ex Gloucestershire stock. *Euphydryas aurinia* (Rott.), ab. *sebalus* Schultz from multi-cold shocked pupae, ex inbred UK stock, May 2011. *Melitaea parthenoides* (Keferstein), an unusual male with *fasciata* type forewings, bred naturally, and a female aberration from a cold-shocked pupa, all from wild collected egg masses, Charente, France, May 2011. *Melitaea athalia* (Rott.), a female ab. *corythalia* Hübner and an unusual male aberration with elements of ab. *cymothoe* Bertolini from cold shocked pupae, all from wild collected females, Charente, France May 2011.

Pararge aegeria (L.), three specimens showing variation in the expression of ab. *cockaynei* Goodson, from eggs laid by Buckinghamshire females late in the season and reared in warmth but natural day length, January to March 2011.

The last part of the breeding experiments detailed in the 2010 exhibition report on hybridization between *Polyommatus celina* (Austaut) and *Polyommatus icarus* (Rott.). F₂ hybrids from original pairings between male *celina* and female *icarus* all emerging late November- December 2010. It appears that future generations from this direction of mating remain fertile, yet particularly the males retain some *celina* characters.

Lycaena phlaeas (L.), an unusual aberration (Plate 9, Fig 3) bred from captive third generation stock from a female taken in Scotland and subsequently maintained by M. Gascoigne-Pees. The larvae were reared in a conservatory and the exhibitor considers this aberration may have arisen from a natural heat shock at a critical point in the developing pupa. Emerged November 2010.

JONES, A. M – *Pieris rapae* (L.), a mixed gynandromorph, the left forewing predominantly female with flecks of male colour, the left hindwing a mixture of both sexes, the right forewing mixed but with more female characteristics and the right hindwing mostly male. This was bred in an F₁ brood in October 2011 from a female

taken at Kingston, Surrey. The brood comprised 72 individuals; 36 males, 35 females and the gynandromorph. Pairings were achieved with the stock, but fertility of ova was low and only a few larvae were reared and no gynandromorphs appeared in the F₂ generation.

Lycaena phlaeas (L.) results of breeding from a female ab. nov. The female appearing to be an albino, with the usual dark areas being replaced with cinnamon colour. This was taken in Surrey on 22.ix.2010 and laid 100 ova, the resulting larvae were overwintered, but despite about 50 surviving only 22 eventually emerged as adults. A pairing was observed but few ova were laid and only a small F₂ generation was reared comprising 50 individuals; 22 type males, 2 aberrant males, 18 type females and 8 aberrant females (Plate 9, Fig 4). Several of the aberrations were crippled and no pairings were seen with the aberrations. Some eggs laid by type examples were fertile, but the larvae were rather weak and an F₃ generation of 12 was reared comprising; 6 type males, 4 type females and 2 aberrant females. These results suggest a recessive gene, the F₂ generation producing 20% aberrations instead of the expected 25% but several pupae failed to hatch and many butterflies were crippled suggesting a weakness in the stock which may have influenced the results. The specimens seem different to the known albino form ab. *hubneri* Oberthür which is very much paler, the classic example being captured by N.C. Pilleau in August 1926 at Folkestone, Kent.

Argynnis paphia ab. nov, (Plate 9, Fig 6) an unusual female aberration taken in July 2010, with dark suffusions rather than the normal coalescing of markings characteristic of ab. *confluens* Spuler and ab. *ocellata* Frings etc. This seems to be much rarer than the other forms and it is the most notable of only a few similar examples seen in many years of diligent observation by the exhibitor of *A. paphia* in the wild.

Argynnis paphia (L.), three gynandromorphs, two bilateral and one nearly so, with tiny areas of female on the male side, all with the left side female. These were bred from a small F₁ generation in June 2011, comprising 60 individuals; 26 males, 31 females and the 3 gynandromorphs. The brood proved difficult to pair and only one sibling pairing was achieved; however males from an unrelated parent paired with several females. Another extreme mixed gynandromorph (Plate 9, Fig 7) was taken in July 2011, this having the left side male, the right hindwing female and the right forewing a mosaic of both sexes.

KNILL-JONES, S. – *Pieris napi* (L.) a dwarf specimen with a wing span of 28mm.

PARKER, R. – Two photographs of a male *Polyommatus icarus* (Rott.), ab. *radiata* Courv. exhibited on behalf of Trevor Goodfellow; taken on 3.viii.2011 at Thurston, Suffolk. The figured example showed the characteristics of the heritable form *radiata*; further studies of this *P. icarus* population would be interesting.

YEATES, M. A. – Two aberrations of *Polygonia c-album* (L.) induced by chemical treatment showing intermediate and melanic examples of ab. *reichstettensis* Fettig together with a typical specimen from the same experiment. Six-hour old pupae were injected with 1µl of a 1M solution of sodium tungstate (Na₂WO₄). Of sixteen pupae treated, 8 adults emerged on the 21.vii.2011 comprising 3 melanics, 1 intermediate and 4 typical. It is not yet known how this treatment works but sodium tungstate clearly alters wing pattern in a very similar way to thermal shock. The original idea was introduced by Joji Otaki in his 1998 paper 'Colour-pattern modifications of butterfly wings induced by transfusion and oxyanions' (*Journal of Insect Physiology* 44: 1180–1190), where various chemicals were tested on pupae of *Vanessa cardui* (L.).

BRITISH MACROMOTHS

BROWN, D. C. G. – An exhibit showing some interesting forms/aberrations taken in 2011. These comprised a striking example of the *conversaria* form of *Alcis repandata* (L.) from Crowcombe, Somerset, 15.vi.; a strongly marked female example of *Lymantria monacha* (L.) from Maentwrog, Gwynedd, 21.vii.; a dark form of *Ochropleura plecta* (L.) from Preston Montford, Salop, 8.viii. (Plate 10, Fig. 1); a pale, unmarked form of *Agrotis clavis* (Hufn.) from Bishops Itchington, Warks, 17.vi. (Plate 10, Fig. 2); a dark, obscure aberration of *Xestia triangulum* (Hufn.) from Whichford Wood, Warks., 1.vii. (Plate 10, Fig. 3).

CLANCY, S. P. – A selection of species that had been recorded in the Dungeness area of East Kent during 2011. These included *Drepana curvatula* (Borkh.) from Lydd-on-sea on the very early date of 21.iv.; *Gluphisia crenata* (Esp.), a male example taken at Dungeness on 26.vi., the second modern record of this moth in Britain (Plate 10, Fig. 7); *Coscinia cribraria* (L.), an example of the weakly marked immigrant race *arenaria* from Dungeness on 27.vi.; *Utetheisa pulchella* (L.), one taken at light at Dungeness on 4.x.; *Nola aerugula* (Hübner), two examples from Lydd-on-sea and Dungeness, both on 27.vi.; *Actinotia polyodon* (Clerck), from Greatstone on 7.v.; *Eublemma purpurina* (D.&S.), the first area record, from Dungeness on 29.viii.; *Eublemma parva* (Hübner), two of the several examples of this species recorded during 2011 (a record year for this moth in the Dungeness area); and *Catocala sponsa* (L.), a female from Greatstone on 2.viii.

CLARKE, J. H. – A selection of moths that included examples of *Camptogramma bilineata atlantica* (Stdgr.) and *Diarsia mendica orkneyensis* Byt.-Saltz. from the Orkneys in 2011. Other moths shown included bred *Drepana curvatula* (Borkh.) from a female taken at Dungeness, Kent, on 7.v.2011 with a note that a male was also taken at the same time; *Eupithecia abietaria* (Goeze) taken at Muir of Ord, Inverness on 16.vi.2010; the *bimacula* form of *Callimorpha dominula* (L.) bred from larvae from the Wirral, Cheshire; and *Eublemma parva* (Hübner) bred from larvae collected in Cornwall and Dorset during 2011.

CLIFTON, J. – The first British specimen of the southern European noctuid *Sesamia nonagrioides* (Lefeb.) that had been taken by M. E. Hicks on St Agnes, Isles of Scilly, Cornwall, on 21.x.2011 (Plate 10, Fig. 5a). It was exhibited with foreign examples for comparison (Plate 10, Fig. 5b).

COOK, R. R. – Specimens of *Eublemma parva* (Hübner) reared from larvae found at the Cogden National Trust site, Dorset, on 3 and 9.viii.2011.

DEANS, M. J. – A selection of species of interest recorded in 2011 that included two specimens of *Itame brunneata* (Thunb.) and details of 13 further examples taken at two sites in east Suffolk over the nights of 4 & 5.vi.; *Lithophane furcifera* (Hufn.), an example taken at Lynachlaggan, Insh, Inv. on 9.iv. (Plate 10, Fig. 4); *Dryobotodes tenebrosa* (Esp.), one of two taken at ivy blossom at Durlston, Dorset, 24.ix.; *Xanthia ocellaris* (Borkh.) an example from Durlston, Dorset, on 24.ix. with details of two further records from Dorset; *Eublemma parva* (Hübner), adults bred from larvae found at Cogden Beach, Dorset, on 13.viii.

DICKERSON, B. – A small exhibit that included an example of *Costaconvexa polygrammata* (Borkh.) from Eaton Ford, Beds., 7.v.2011 (captor: A. Lawrence); the first record of *Diacrisia sannio* (L.) from Huntingdonshire in over 50 years from Offord D'Arcy, 2.vi.2011; and a bilateral gynandromorph *Agrotis puta* (Hübner) from Alconbury, Hunts., 1.viii.2011.

HALL, N. M. – An exhibit largely composed of species of interest recorded from Berkshire in 2011. These included most notably *Lampropteryx otregiata* (Metc.),



PLATE 9. 1: *Issoria lathonia*, melanic upperside (a) and underside (b), temperature experiment 2010, K. E. J. Bailey. 2: *Aglais urticae* ab. *conjuncta*, bred 2011, K. E. J. Bailey. 3: *Lycaena phlaeas* ab., bred 2010, K. E. J. Bailey. 4: *Lycaena phlaeas*, bred 2011, A. M. Jones. 5: *Argynnis paphia*, male underside, bred 2011, K. E. J. Bailey. 6: *Argynnis paphia*, suffused ab., wild caught vii 2010, A. M. Jones. 7: *Argynnis paphia*, mixed gynandromorph, wild caught, vii 2011, A. M. Jones. Scale bar = 10mm.

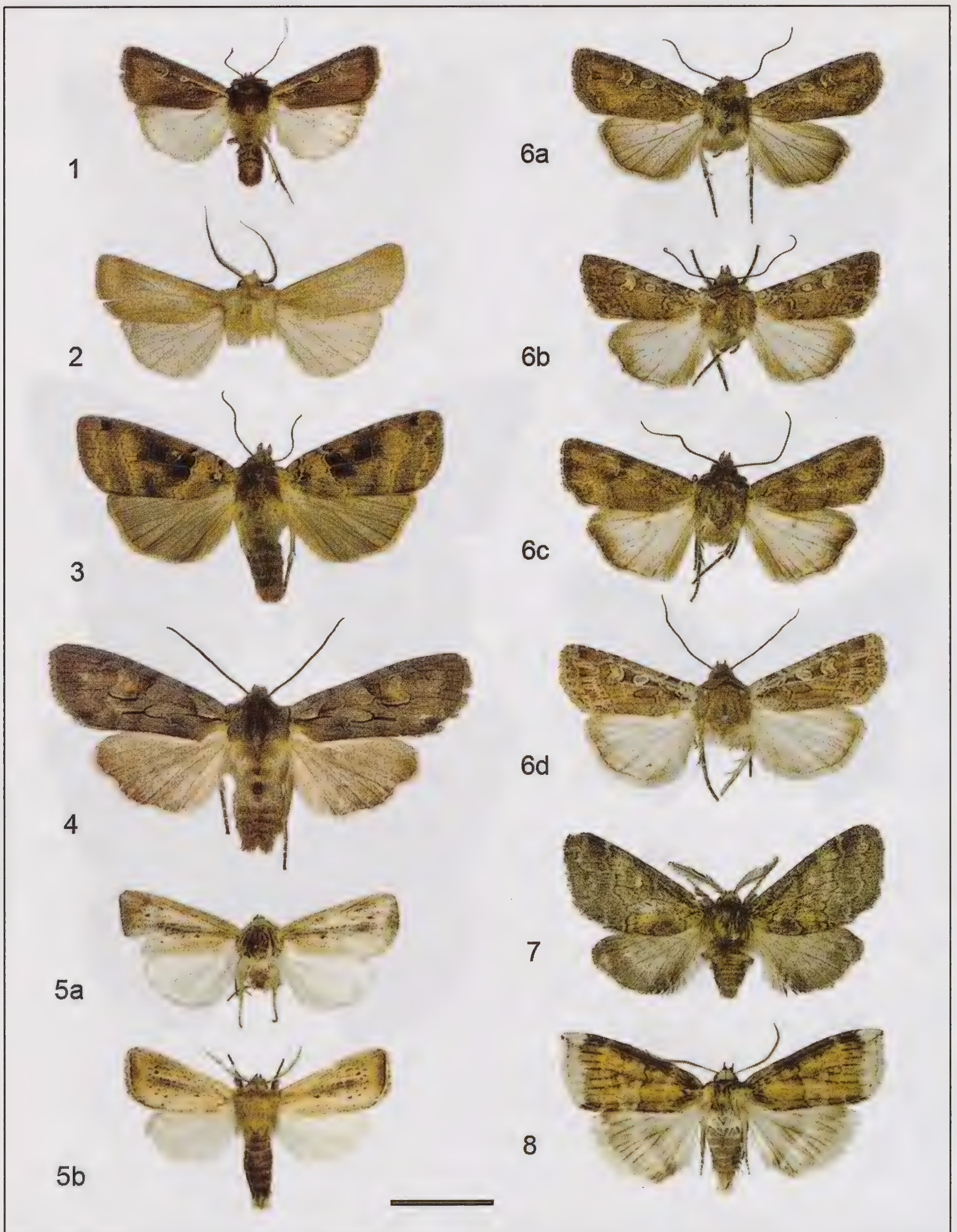


PLATE 10. 1: *Ochropleura plecta*, Preston Montford, Salop, 8.viii.2011, D. C. G. Brown. 2: *Agrotis clavis*, Bishops Itchington, Warks., 17.vi.2011, D. C. G. Brown. 3: *Xestia triangulum*, Whichford Wood, Warks., 1.vii.2011, D. C. G. Brown. 4: *Lithophane furcifera*, Lynachlaggan, Inverness, 9.iv.2011, M. J. Deans. 5: *Sesamia nonagrioides* (a) captured by M. E. Hicks, St Agnes, Isles of Scilly, Cornwall, 21.x.2011, exhibited by J. Clifton and (b) a specimen from André, Portugal, 7.x.1996, C. Plant, for comparison. 6: *Euxoa eruta* (a) La Broderie, Guernsey, 31.vii.1987, (b) St. Peters, Guernsey, 4.vii.1988, (c) St. Peters, Guernsey, 19.vii.1997 captured by P. M. D. Costen and (d) Portland Bird Observatory, Dorset, 9.viii.1992, captured by M. Cade and exhibited by P. H. Sterling. 7: *Gluphisia crenata*, Dungeness, Kent, 26.vi.2011, S. P. Clancy. 8: *Cymatophorima diluta*, Friday Street, Surrey, 8.ix.1981, J. Halsey. Scale bar = 10mm.

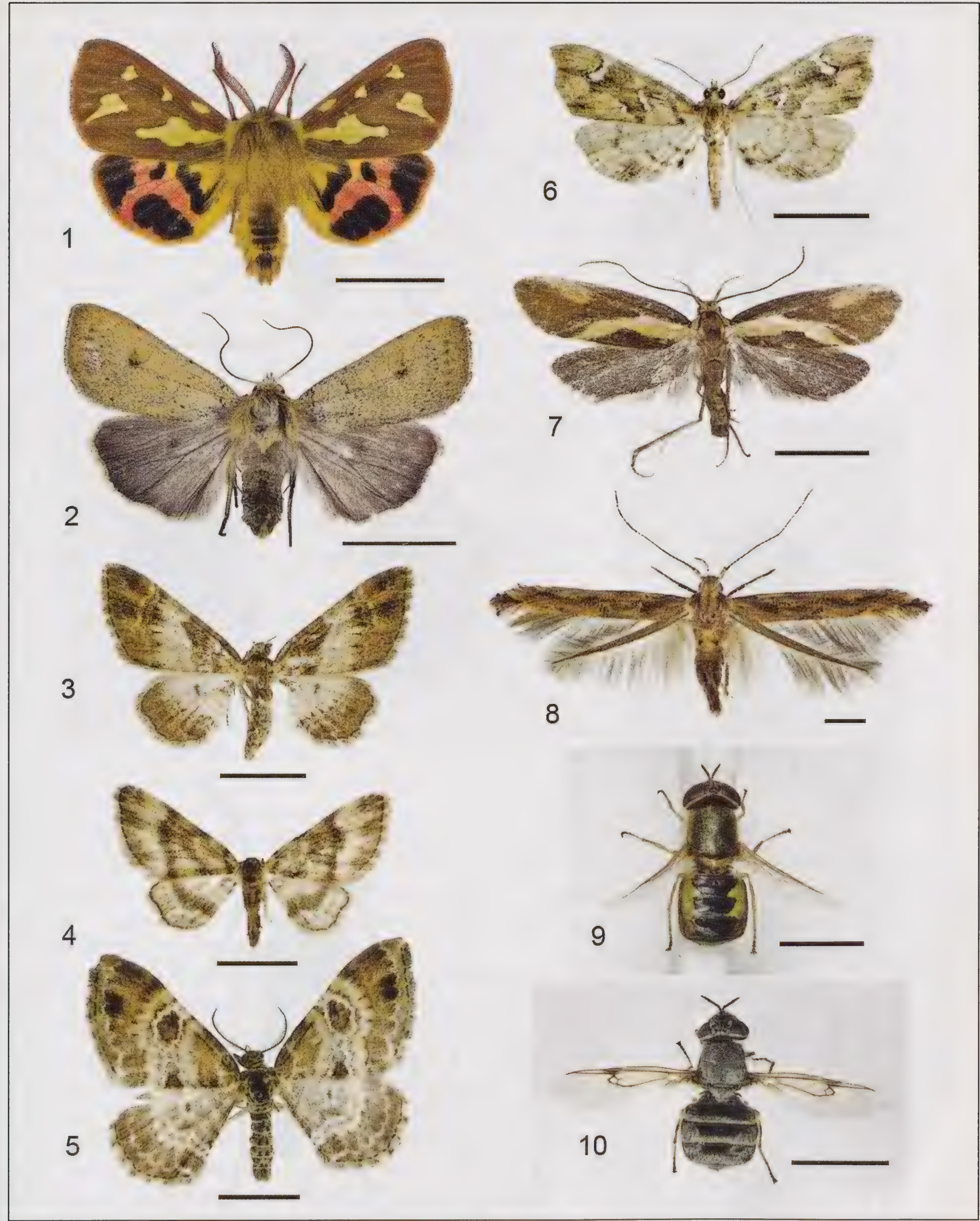


PLATE 11. 1: *Hyphoraia testudinaria*, Totland, Isle of Wight, 5.v.2011, S. A. Knill-Jones. 2: *Xestia castanea*, Greenham Common, Berks, 1.ix.2011, N. M. Hall. 3: *Gymnoscelis rufifasciata*, Bonchurch, Isle of Wight, 26.iv.2006, J. Halsey. 4: *Gymnoscelis rufifasciata*, Teignmouth, Devon, 8.iv.2011, R. McCormick. 5: *Xanthorhoe spadicearia*, Hennock, Devon, 3.v.2011, B. Bewsher, exhibited R. McCormick. 6: *Musotima nitidalis*, Crawley Down, West Sussex, 26.x.2011, J. Clarke. 7: *Harpella forficella*, Wokingham, Berks, 19.viii.2011, M. C. Harvey and N. J. Percival. 8: *Anatrachyntis badia*, Putney, Surrey, 1.x.2001, M. Honey. 9: *Odontomyia angulata*, Woodbastwick Fen, East Norfolk, 4.vii.2011, D. J. Gibbs. 10: *Odontomyia argentata*, Thundry Meadows, Elstead, Surrey, 29.iv.2011, A. J. Halstead. Scale bars 1 & 2=10mm; 3–7, 9 & 10=5mm; 8=1mm.

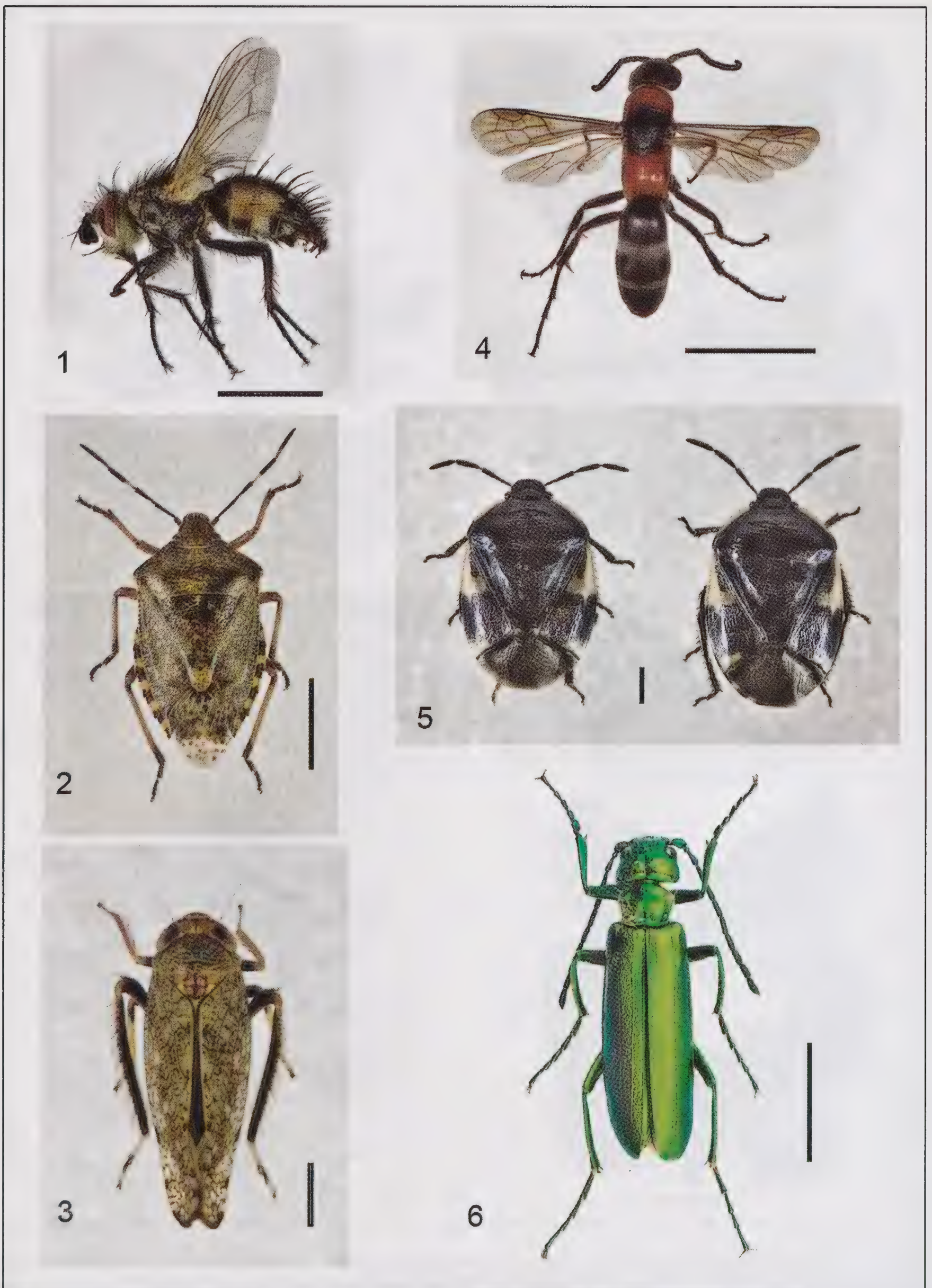


PLATE 12. 1: *Linnaemya picta*, Lode, Cambs, 13.viii.2011, I. Perry. 2: *Rhaphigaster nebulosa*, Warwick Gardens, Peckham, London, 23.ix.2011, T. Bantock. 3: *Orientus ishidae*, Warwick Gardens, Peckham, London, 23.ix.2011, T. Bantock. 4: *Homonotus sanguinolentus*, Witley Common, Surrey, 14.vii.2011, D. W. Baldock. 5: *Tritomegas sexmaculatus*, Tyland Barn, Maidstone, Kent, viii.2011, T. Bantock. 6: *Lytta vescicatoria*, Castlehaven, St. Catherine's Point, Isle of Wight, 11.vi.2011, R. Dickson. Scale bars: 1, 2, 4 & 6 = 5mm; 3 & 5 = 1mm.

recorded from a new site at Greenham Common, 1.ix.; *Xestia castanea* (Esp.), an example of the rare yellow form from Greenham Common, 1.ix. (Plate 11, Fig. 2); *Xanthia gilvago* (D. & S.), Earley, 30.ix.; and *Hydraecia petasitis* (Doubl.), Thatcham, 20.vii. A specimen of *Itame brunneata* (Thunb.) was also shown that had been taken in Salisbury, Wiltshire on 6.vi.

HALSEY, J. – An exhibit largely comprised of moths from the Isle of Wight that included a dark *Idaea aversata* (L.) from Bonchurch, 18.vii.2011; a striking form of *Gymnoscelis rufifasciata* (Haw.) from Bonchurch, 26.iv.2006 (Plate 11, Fig. 3); *Agrotis crassa* (Hübner) from Bonchurch, 25.vii.2011; a rather unmarked example of *Mythimna ferrago* (Fabr.), Bonchurch, 25.vi.2011; and two *Eublemma parva* (Hübner) from Bonchurch, 28.vi.2011 shown alongside two darker specimens that had been reared from larvae found on the island in late July. Several other species taken away from the Isle of Wight were shown including two striking examples of a suffused form of *Cymatophorima diluta* (D. & S.) recorded in Surrey from Friday Street on 8.ix.1981 and near Richmond Park on 9.ix.2007, the earlier of these two specimens being shown on Plate 10, Fig. 8. Also exhibited were two of 12 examples of *Thaumetopoea processionea* (L.) attracted to mv light near Richmond Park, Surrey on 1.viii.2011, and an unmarked *Malacosoma neustria* (L.) from Rainham, Kent, 12.vii.1991.

HAYWARD, R. – A number of species of interest recorded from the exhibitor's garden in Wokingham Without, Berkshire in 2011, most notably *Cyclophora puppillaria* (Hübner) on 2.x., *Itame brunneata* (Thunb.) on 6.vi., *Petrophora chlorosata* (Scop.) a banded form taken on 2.vi., and *Minucia lunaris* (D. & S.) on 10.v., the latter new to the county. Also shown was a selection of unseasonal records, and moths from other localities that included *Eilema caniola* (Hübner) from Meopham, Kent, and *Eublemma parva* (Hübner) from Mullion, Cornwall, recorded on 30.ix.2011.

HENWOOD, B. P. – An exhibit largely composed of moths of interest recorded by the exhibitor in Devon during 2011. The most notable of these were *Cyclophora ruficiliaria* (H.-S.), the first county record from Goat Island, 30.vii.; *Itame brunneata* (Thunb.) from Abbotskerswell, 3.vi (new to the county in 2011); *Chortodes fluxa* (Hübner) the first county record for over 30 years from Goat Island on 30.vii.; *Eublemma parva* (Hübner), ex. larvae found in three Devon localities (and one in VC11) during August; *Heliothis peltigera* (D. & S.), one bred from a larva found on *Pulicaria dysenterica* at Prawle, 7.viii.; and *Trichoplusia ni* (Hübner) taken at Abbotskerswell, 17.ix..

JENKINS, A. – An interesting selection of species recorded from wide-ranging sites across Britain during 2011. These included examples of *Synanthedon formicaeformis* (Esp.) from Wicken, Cambs, 22.vii.; *Leucodonta bicoloria* (D. & S.) from Glencar, Co. Kerry, 29.v.; *Spilosoma luteum* (Hufner), a rather suffused form from Glencar, 3.vi; *Trichoplusia ni* (Hübner) from Chardstock, Devon, 1.x.; and *Macdunnoughia confusa* (Steph.) from West Bexington, Dorset, 1.x.

KNILL-JONES, S. A. – Another interesting selection of moths from the Isle of Wight in 2011, mostly recorded by the exhibitor at Totland. These included two examples of *Hyphoraia testudinaria* (Geoff.), one from Totland on 5.v. (Plate 11, Fig. 1) and one found on a shop window in Newport on 6.v., the first county records. Also shown of special interest from Totland were examples of *Cyclophora puppillaria* (Hübner) on 3.x., *Itame brunneata* (Thunb.) on 8.vi., *Utetheisa pulchella* (L.) on 14.x., *Nola aerugula* (Hübner) on 28.ix., *Trigonophora flammea* (Esp.) on 16.x., *Xanthia gilvago* (D. & S.) ab. *paleago* on 11.x., *Xanthia ocellaris* (Borkh.) on 1.x., and *Macdunnoughia confusa* (Steph.) on 2.x.

MASTERS, I. D. – From Middleton-on-sea, Sussex, in 2011: two examples of *Cyclophora puppillaria* (Hübner) taken on 19.v. & 3.x., with details of others during the year on 19.viii, 21.viii (two), 1.ix., and 13.x (recorded as new to the site in 2010, the 2011 records are suggestive of an element of local breeding); *Agrotis ipsilon* (Hufner), an early specimen taken on 11.ii.; *Eublemma parva* (Hübner) the first site record, taken on 7.vii. In the BENHS exhibition report for 2010, an incorrect date (18.viii.2010) was given for the capture of *Macdunnoughia confusa* (Steph.) at Middleton-on-sea: the correct date is 8.viii.2010 (*BJENH* 24:148).

MCCORMICK, R. F. – Species of interest recorded in Devon during 2011 by a number of recorders, although the specimens shown were not necessarily those recorded during the 2011 season. Species exhibited included the first county records of *Zygaena lonicerae latomarginata* Tutt (P. Bowers); a dark form of *Idaea aversata* (L.) from Colyton, 21.vi. (P. Vernon); an aberration of *Xanthorhoe spadicearia* (D. & S.) with an incomplete median band from Hennock, 3.v. (B. Bewsher) (Plate 11, Fig. 5); an unusual form of *Gymnoscelis rufifasciata* (Haw.) from Teignmouth, 8.iv. (Plate 11, Fig. 4); details of eight records of *Itame brunneata* (Thunb.) from the county in early June; details of three records of adult *Acherontia atropos* (L.) from the county during September; the first four county records of *Xanthia ocellaris* (Borkh.) from Uplyme (O. Woodland) on 28.ix., 29.ix., and 30.ix, and Exeter (G. & J. Jarvis) on 14.x.; *Chortodes fluxa* (Hübner) the first county record for over 30 years from Goat Island on 30.vii (B. P. Henwood); and *Eublemma parva* (Hübner), details of 24 specimens recorded in Devon during July.

OWEN, J. – Seven species from the exhibitor's garden near Dymchurch, East Kent, that were recorded as new to the site in 2011: *Asthenes albulata* (Hufner), 23.iv.; *Eublemma parva* (Hübner), 29.vi. & 13.vii.; *Catocala sponsa* (L.), 27.viii. & 2.ix.; *Catocala fraxini* (L.), 29.ix.; *Hypena rostralis* (L.), 8.vii.; *Macrochilo cribrumalis* (Hübner), 8.vii.; and *Trisateles emortualis* (D. & S.), 15.vii. Two other additions to the garden list in 2011 that could not be exhibited involved records of *Chrysodeixis chalcites* (Esp.) on 28.x., and *Hypena obsitalis* (Hübner) on 9.xi. These bring the total number of macromoths recorded from this long-standing recording site to 528 species, surely one of the biggest garden species lists in Britain. Also shown from the same site in 2011 were examples of *Drepana curvatula* (Borkh.) recorded on 7.v., *Notodonta tritophus* (D. & S.) recorded on 2.viii, and an aberrant *Spilosoma lubricipeda* (L.) showing some localised dark scaling, recorded on 18.v.

PAGE, A. – A varied exhibit of moths bred or taken during the 2011 season that included *Epirrhoe tristata* (L.) bred from a female, Loch Arkaig, Inverness, 24.vi.2010; *Selenia lunularia* (Hübner) bred from a female, Kiltarlity, Inverness, vi.2010; *Odontognophos dumetata* (Treits.) bred from larvae, Lough Bunny, Co. Clare, 9.vi.2011; *Thaumetopoea processionea* (L.) bred from larvae, East Sheen, Surrey; and *Heliophobus reticulata* (Goeze) from Ballycotton, Co. Cork, 6.vi.2011.

PHILLIPS, J. W. – A small selection of species of interest recorded from Northney, Hayling Island, Hampshire in 2011. These included *Itame brunneata* (Thunb.) 4.vi., *Hyles livornica* (Esp.) 7.v., and *Xanthia gilvago* (D. & S.), an example of ab. *paleago* (a form not known from any resident populations, thus indicating an immigrant source).

ROUSE, T. – An exhibit featuring several minor aberrations and irregular forms, and including bred examples of *Eublemma parva* (Hübner) from larvae collected in Dorset on 12 August 2011, and an interesting record of *Cyclophora porata* (L.) from Densole, Kent, on 28.viii.2011, away from any known breeding populations.

SIMS, I. – An exhibit that included three species of interest from Berkshire (VC22): *Mythimna albipuncta* (D. & S.), three of seven examples taken at three localities in

2011, confirming a breeding presence in the county; *Lithophane semibrunnea* (Haw.), an overwintering adult found at Lower Earley on 16.x.2010; and *Dichonia aprilina* (L.) recorded at Lower Earley on 6.x.2011.

STERLING, P. H. – Three rare migrants recorded at West Bexington, Dorset during 2011: *Daphnis nerii* (L.), 20.ix. (captor R. Eden), *Trigonophora flammea* (Esp.), 5.x., and *Catocala electa* (View.), 22.viii. Also shown was a specimen of *Catocala fraxini* (L.) from Wareham, Dorset and a series of a new British species *Euxoa eruta* (Hübner.) (Plate 10, Figs 6a-d) that has recently been confirmed from Portland, Dorset and Portsmouth, Hampshire by the exhibitor by way of the complex process of genitalia dissection required to determine this species.

THIRLWELL, I. – Two aberrations from Portsmouth, Hampshire were shown: *Arctia caja* (L.), a very dark, rather worn specimen taken on 30.viii.2011, and *Autographa gamma* (L.) a form with a broken 'gamma' mark taken on 11.viii.2011.

WARING, P. – An exhibit detailing recent developments within the small Lincolnshire population of *Athetis pallustris* (Hübner.) at the Saltfleetby/Theddlethorpe NNR. Good larval numbers were recorded at one site and two larvae were found in an establishment site where habitat creation was followed by the release of ten larvae in 2009. This seemed to indicate that *A. pallustris* had survived in this new area for two seasons following the release.

WHEELER, P. R. – A small selection of macromoths from Beddington, Surrey that included examples of *Hadena confusa* (Hufner.) taken on 2.vi.2011, and *Macdunnoughia confusa* (Steph.) taken on 20.ix.2011, the latter species believed to have a small breeding colony in this area.

BRITISH MICROLEPIDOPTERA

BEAVAN, Miss S. D. & HECKFORD, R. J. – *Plutella haasi* Staudinger, Ben More, Mull, Mid Ebudes (VC103), larvae on *Arabidopsis petraea* 12.ix.2010, moths reared 3 & 24.iii.2011, new to VC103 and only the fourth known British locality. *Rhigognostis annulatella* (Curtis), Ben Hope, West Sutherland NC470483 (379 m) (VC108) larvae on *Cardamine hirsuta* 19.iv.2011, moths reared 27.v.2011. Ben Hope is a mountain just under 13 km inland. This is the second time that larvae have been found on this foodplant in the British Isles and the second time that the species has been found inland and in a mountainous area in the British Isles, as the larva is otherwise found on *Cochlearia officinalis* in coastal localities. *Dichomeris juniperella* (L.), Rinabaich, South Aberdeen NO3096 (VC92) 9.ix.2011, a female in fresh condition. One of three adults seen that day, when larvae, pupae and exuviae were also found. Hitherto the adult has otherwise only been recorded in July in Scotland. This may represent a second generation. *Aethes tesserana* (D. & S.), Sandy Bay, South Devon SY030798 (VC3) larvae in roots of *Picris echioides* 25.ii.2011, moths reared 6–30.iv.2011. *Celypha rufana* (Scopoli), moth reared on 10.ix.2011 from ovum laid by a female caught on 7.vii.2011 at Gait Barrows, West Lancashire SD4877 (VC60). The larva fed on decaying leaves of *Taraxacum officinale* agg. and not on the roots or rootstocks of *Chrysanthemum vulgare* or *Artemisia vulgaris*, being the foodplants given in British literature; neither of these occurred where the moth was found at Gait Barrows. Possibly not previously reared in the British Isles. *Olethreutes palustrana* (Lienig & Zeller), Red Screes, Westmorland NY397085 (730 m) (VC69) 8.vii.2011. Hitherto we have only found this species at low elevations. *Epiblema cnicicolana* (Zeller), Sandy Bay, South Devon SY030798 (VC3) larvae in dead stems of *Pulicaria dysenterica* 25.ii.2011, moths reared 27.iii.2011. *Selania leplastriana* (Curtis), Compass Cove, South Devon SX8849 (VC3) larva in stem of *Brassica*

oleracea 23.v.2011, moth reared 22.vi.2011; Dartmouth Castle, South Devon SX8850 (VC3) larva in stem of *Brassica oleracea* 23.v.2011, moth reared 25.vi.2011. New localities for the species in Devon which until 2011 was known only from Torquay. *Scoparia ancipitella* (La Harpe), Offwell Woods South Devon SY190993 (VC3) 5.viii.2011 at light. First confirmed Devon record since 1962 and only the fourth known Devon locality. *Homoeosoma nimbella* (Duponchel), Pendeen Watch, West Cornwall SW378966 (VC1) larva in seedhead of *Jasione montana* 25.vii.2011, moth reared 24.viii.2011 (genitalia determination). Apparently only the third known Cornish locality. *Phycitodes saxicola* (Vaughan), Pendeen Watch, West Cornwall SW378359 (VC1) larva in flowerhead of *Inula crithmoides* 25.vii.2011, moth reared 26.ix.2011; exhibited for comparison with *H. nimbella*.

CLANCY, S. – *Agriphila inquinatella* (D. & S.), Dungeness, TR0917, East Kent (VC15), 2.viii.2011, a striking form; *Duponchelia fovealis* Zeller, Lydd, TR0420, East Kent (VC15), 6.vii.2011, found indoors; *Eudonia delunella* (Stainton), Dungeness, TR0917, East Kent (VC15), 27.vi.2011, possibly immigrant; *Uresiphita gilvata* (Fabr.), Greatstone, TR0823, East Kent (VC15), 3.x.2011, first area record; *Oxyptilus laetus* (Zeller), Dungeness, TR0917, East Kent (VC15), 8.ix.2011, immigrant, first area record.

CLARKE, J. – *Musotima nitidalis* (Walker), Crawley Down, TQ3437, West Sussex (VC14) 26.x.2011, at mv (Plate 11, Fig. 6). Second record from the British Isles.

CLIFTON, J. – *Clavigesta sylvestrana* (Curtis), several taken at Acle, TG3910, East Norfolk (VC27), viii.2011, new to Norfolk; *Bryotropha terrella* (D. & S.), Lisburn, Co Antrim, vi.2011, oddly-coloured; *Mompha bradleyi* Riedl, Eye, TM1474, East Suffolk (VC25), x.2011, new to Suffolk; *Apotomis semifasciana* (Haworth), Outer Hebrides (VC110), vii.2011, det. genitalia, new to VC; *Nemophora minimella* (D. & S.), Beeston Regis, TG1642, East Norfolk (VC27), viii.2011, netted by daytime, new to Norfolk; *Pammene albuginana* (Guenée), Cawston, TG1323, East Norfolk (VC27), v.2011, pheromone lure; *Dioryctria schuetzeella* Fuchs, Weston Park, TG1214, East Norfolk (VC27), new to Norfolk; *Cydia inquinatana* (Hübner), Weston Park, TG1214, East Norfolk (VC27), vi.2011, new to Norfolk and fourth for Britain; *Pammene giganteana* (Peyerimhoff), Snettisham, TF6834, West Norfolk (VC28), iv.2011, first since 1899 for the county; *Eana incanana* (Stephens), Hidolveston, TG0329, East Norfolk (VC27), vi.2011, first confirmed record for Norfolk.

DEANS, J. – *Cymolomia hartigiana* (Saxesen), Plumbeous Spruce Tortrix, Bawdsey Manor, TM337379, East Suffolk (VC25), 17.vii.2007, attracted to mv light, **new to Britain**. *Cydia inquinatana* (Hübner), Bawdsey Manor, TM332381, East Suffolk (VC25), 30.vi.2010, attracted to mv light, third British record. The second was trapped at the same locality, by the exhibitor, two nights earlier (determined by genitalia, J. Clifton). *Ortholepis betulae* (Goeze), Bawdsey Manor, TM337379, East Suffolk (VC25), 4.vi.2011, at mv light and Sizewell TM4762, East Suffolk (VC25), 4.vi.2011. First recent Suffolk records.

DICKSON, R. J. – *Elegia fallax* (Staudinger), Stubbington SU5503 South Hants (VC11) 24.iv.2011, leg. Dan Houghton, **new to Britain** (one record from the Channel Islands). Two *E. similella* (Zincken) for comparison. *Chrysoclista linneella* (Clerck), Bishop's Inclosure nr Shirrell Heath SU5814 South Hants (VC11) 1.vii.2011, mv, leg. Maurice Opie; *Cydia illutana* (H.-S.) ♂, Botley Wood SU5410 South Hants (VC11) 20.v.2011, mv, determined by genitalia, RJ Dickson; *Goniodoma limoniella* (Stainton), Funtley SU565081 South Hants (VC11) 2.vii.2011, garden mv trap, leg. Maurice Opie, unusual record from an inland site; *Bohemannia quadrimaculella* (Boheman), Funtley SU565081 South Hants (VC11) 29.vii.2011, garden mv trap, leg.

Maurice Opie; *Acrolepiopsis marcidella* (Curtis), mine with cocoon on butcher's broom, Cams Bay (wood) SU5905 South Hants (VC11) 17.viii.2011 (larva spun up later).

EVANS, D. & STERLING, P. H. – *Musotima nitidalis* (Walker), Merritown Heath Nature Reserve, Hurn, SZ1199, Dorset (VC9), 11.viii.2009, at mv light, **new to Britain**. Native to Australia and New Zealand and is likely to have been imported accidentally through the horticultural nursery trade.

HARPER, M. W. & SIMPSON, A. N. B. – *Ypsolopha horridella* (Treitschke), Ledbury, SO7137, Herefordshire, 27.vii.2011, mv, first for VC36; *Gelechia scotinella* H.-S., Ledbury, SO7137, Herefordshire (VC36), two on 26.vii.2011, new to VC; *Coleophora niveicostella* Zeller, Dinmore Hill SO5151, Herefordshire (VC36), flying over anthills at dusk, second recent for VC; *Eulamprotes immaculatella* (Douglas), Ledbury, SO7137, Herefordshire (VC36), 3.x.2011, mv, new for VC; *Lampronia capitella* (Clerck), Wyre Forest, SO7476 approx., Worcestershire (VC37), 6.iv.2011, bred from larvae in shoots of red currant, *Ribes rubrum*; *Dichomeris alacella* (Zeller), Carpenter's Farm, Berrow, SO7558, Worcestershire (VC37), 27.vii.2011, leg. Dr. M. B. Skirrow, detd genitalia; *Mompha divisella* (H.-S.), Bewdley, SO7875, Worcestershire (VC37), 19.ix.2011, leg. I. Machin, detd genitalia O.Wadsworth, first confirmed VC record; *M. divisella*, Birdlip, Tregroes SN4044, Ceredigion (VC46), 26.iii.2011, genitalia determination.

HARVEY, M. & PERCIVAL, N. The oecophorid *Harpella forficella* (Scopoli), Wokingham, Berks, 18.viii.2011, **new to Britain** (Plate 11, Fig. 7) More details are given in Percival & Harvey, *BJENH* 24 (2011): 220.

HAWKINS, R. D. – *Lyonetia clerkella* (L.), Horley, TQ2843, Surrey (VC17), mine with emergence-hole in a leaf of laurel, *Prunus laurocerasus*, taken from a trimmed garden hedge 18.x.2011. He noted that the poisonous vapour given off by chopped leaves of this plant has traditionally been used to kill insects.

HECKFORD, R. J. - *Dahlica lichenella* (L.), The Ride, Saltram, Plymouth, South Devon SX506546 (VC3) case on trunk of *Quercus ilex* 14.ii.2010, moth reared 13.iii.2010 (confirmed by DNA analysis of another from the same locality), new to Devon. *Infurcitinea albicomella* (Stainton), Thatcher Point, Torquay, South Devon (VC3) 14.vii.2011. This is a new locality and about 1.5 km to the east of the only other British locality from which the species is currently known. *Metalampra italica* Baldizzone, nine specimens from the exhibitor's garden at Plympton, Plymouth, South Devon SX542571 (VC3), where the species was found to be very locally common in 2011, to show both the variation in wingspan (10–14mm) and the intensity of the yellow forewing markings, one moth having hardly any. Five were found as adults between 2–13.vi.2011, the other four were reared between 18.vi–14.vii.2011 from larvae or pupae found under the dead bark of *Corylus avellana* and three garden plants namely *Aucuba japonica*, *Ceanothus* sp. and *Deutzia* sp. between 6.iv.–14.vi.2011. As far as the exhibitor is aware the larva has never previously been found under the bark of any of these species, either in the British Isles or mainland Europe. *Depressaria pulcherrimella* Stainton, Pendeen Watch, West Cornwall SW383359 (VC1) larva in spun flower of *Conopodium majus* 27.v.2011, moth reared 20.vi.2011. Apparently the first record from VC1 since 1949. *Agonopterix kuznetzovi* Lvovsky, Pendeen Watch, West Cornwall SW381359 (VC1) larvae in spun leaves of *Serratula tinctoria* 27.v.2011, moths reared 27 & 29.vi.2011. New locality. *Eulamprotes immaculatella* (Douglas), near Cnoc nam Broc, Wester Ross NG857437 (VC105) 16.v.2011; near South Light, Lundy, North Devon SS144437 (VC4) 21.ix.2011 (genitalia determination), new to VC4. *Scrobipalpa clintoni* Povoln, First Coast, Wester Ross NG921910 (VC105) pupae in dead stems of *Rumex crispus* 18.v.2011, moths reared 19 & 20.v.2011. *Aethes rutilana* (Hübner), Arkle, West

Sutherland NC314436 (377 m), NC313442 (526 m) and NC314442 (531 m) (VC108) pupae in spinings on *Juniperus communis* ssp. *nana* 14.v.2011, moths reared 22–27.v.2011. Also exhibited were seven photographs, two of larval spinings, one of an adult and four of habitats. New to VC108 and only the second known Scottish locality. *Endothenia oblongana* (Haworth), Heybrook Bay, South Devon SX497483 (VC3) pupa in rootstock of *Plantago lanceolata* 4.iv.2011, moth reared 25.iv.2011. *Epiblema tetragonana* (Stephens), Duartmore Burn, West Sutherland NC178368 (VC108) larva in spun leaves of *Rosa canina* 15.v.2011, moth reared 10.vi.2011. New to VC108 and the most northerly British record. *Epischnia bankesiella* Richardson, Pendeen Watch, West Cornwall SW378358 (VC1) larva on *Inula crithmoides* 27.v.2011, moth reared 28.vi.2011. New locality.

HENWOOD, B. – *Agonopterix ocellana* (Fabr.), Horgabost, NG0496, Isle of Harris, Outer Hebrides (VC110), larva 12.vi.2011 on *Salix repens*, bred 14.vii.2011, not listed as having been recorded on Harris by Young, Bland, Harper and Langmaid, A collated list of the microlepidoptera of the Outer Hebrides, *Ent. Gaz.* 2010. *Agonopterix ocellana*, Bernera Bridge, Great Bernera Island, Isle of Lewis, NB165342, Outer Hebrides (VC110), larva 14.vi.2011 on *Salix aurita* bred 22.vii.2011, not listed in the paper cited for Lewis. *Olethreutes schulziana* (Fabr.), A'Chralaig, NH0914, Wester Ross (VC105), 20.vi.2011; and from Applecross, NG7144, Wester Ross (VC105), 20.vi.2011. *Gynnidomorpha permixtana* (D. & S.), Tràigh Na h-Uidhe, NF9890, Isle of Harris, Outer Hebrides (VC110), 12.vi.2011, netted by day, and one bred ex *Pedicularis palustris* collected 16.vi.2011, emerged 1.viii.2011, genitalia determination, not listed for Harris in the paper cited above. *Aethes piercei* Obraztsov, Tarbert (An Tairbeart), NB1500, Isle of Harris, Outer Hebrides (VC110), 14.vi.2011, mv light, not listed for Harris in the paper cited. *Ypsolopha scabrella* (L.), Goat Island, Axmouth/Lyme Regis undercliff, SY3592, South Devon (VC3), 30.vii.2011, mv (with P. H. Stirling & R. J. Wolton). *Gypsonoma oppressana* (Treits.), Hackney Marshes SX8772, South Devon (VC3), 8.vii.2011, mv light. *Yponomeuta sedella* Treits., Abbotskerswell, SX8568, South Devon (VC3), 27.vii.2011, mv. *Calybites phasianipennella* (Hübner), Hackney Marshes SX8772, South Devon (VC3), cone on redshank *Polygonum maculosa* Gray, 10.ix.2011, bred 26.ix.2011. *Ectoedemia lousella* (Sircom), Abbotskerswell, SX8568, South Devon (VC3), ex larva on maple *Acer campestre*, bred 14.viii.2011. *Plodia interpunctella* (Hübner), Indian meal moth, Colyford, SY2492, South Devon (VC3), 3.v.2011, flying inside a pub.

HONEY, M. – *Anatrachyntis badia* (Hodges), Putney, London TQ2475 approx, Surrey (VC17), 1.x.2011, at light in an urban garden, probably the second 'wild caught' British specimen (Plate 11, Fig. 8). Pomegranate species. *Diplopseustis perieresalis* (Walker), Putney, London TQ2475 approx., Surrey (VC17), 15.ix.2011, at light, the second caught in the same garden (12.vii.2010) and tenth UK specimen.

KNILL-JONES, S. – All from Totland, SZ3286, Isle of Wight (VC10). *Aethes cnicana* (Westwood), 31.vii.2011; *Epinotia trigonella* (L.), 19.iv.2011; *Amblyptilia acanthadactyla* (Hübner), 11.x.2011; *Wheeleria spilodactyla* (Curtis), 26.vii.2011; *Gillmeria pallidactyla* (Haworth) 12.vii.2011; *Pandemis heparana* (D. & S.), 1.vii.2011; *Pyrausta despicata* (Scopoli), 12.vii.2011; *Aphelia viburnana* (D. & S.), 16.vii.2011; *Cataclysta lemnata* (L.), 25.vii.2011; *Aethes smeathmanniana* (Fabr.), 13.8.2011; *Aethes williana* (Brahm), 3.vii.2011; *Mecyna asinalis* (Hübner) 27.vii.2011; *Epinotia solandriana* (L.), 13.viii.2011; *Ostrinia nubilalis* (Hübner), 1.x.2011.

LANGMAID, J. R. – *Diplopseustis perieresalis* (Walker), Southsea SZ6598, South Hampshire (VC11), 28.vii.2011; *Choristoneura diversana* (Hübner), Odiham Common SU7553, North Hampshire (VC12), 5.vi.2011, pupa in a spinning amongst

Hypericum sp., a species which is very scarce in Hampshire. *Blastobasis lacticolella* Rebel, *Blastodacna hellerella* (Duponchel), *Grapholita janthinana* (Duponchel) and *Cydia pomonella* (L.), four species reared from fruits of *Sorbus intermedia* (Ehrh.) Pers. at Portsmouth SU6700, South Hampshire (VC11), collected 9.ix.2010. This is an unrecorded foodplant for *B. hellerella*.

MASTERS, I. – *Morophaga choragella* (D. & S.), Middleton-on-Sea SU982004, West Sussex (VC13), 28.vii.2011, mv trap, first for site.

MCCORMICK, R. F. – *Scoparia ancipitella* (La Harpe), Offwell, SY1999, South Devon (VC3), 5.viii.2011, leg. R. J. Heckford and S. Beavan, genitalia determination. The first time this species has been seen in the county since A. H. Dobson recorded it at Harcombe Wood in 1962. *Spoladea recurvalis* (Fabr.), Hennock, SX8280, South Devon (VC3), 18.x.2011, at light, leg. B. Bewsher. *Trachycera suavella* (Zincken), Barnstable, SS5633, North Devon (VC4), 25.vii.2011, leg. N. W. Cottle, confirmed RFMcC, new to VC. *Oxyptilus laetus* (Zeller), Hewton, Bere Alston, SX4466, South Devon (VC3), 30.vi.2011, from a polythene tunnel, leg. P. Barden, genitalia determination J. Hart; Exmouth, SY0080, South Devon (VC3) 2.vii.2011, at light, leg. G. Wisdom; Prawle Point, SX7735, South Devon (VC3), 3.vii.2011, two during the day, P. Barden; Berry Head, Old Quarry, Brixham SX9456, South Devon (VC3), 11.vii.2011, three boxed during evening, leg. R. J. Heckford & S. Beavan; Berry Head, 12.vii.2011 (two), leg. R. J. Heckford & S. Beavan; Culverhole Point, nr Seaton, SX2789, South Devon (VC3), 30.vii.2011, during the day, leg. R. J. Heckford, J. Randall & R. Wolton.

OWEN, J. – all from the exhibitor's garden at Dymchurch, TR0731, East Kent (VC15) at mercury vapour light: *Nascia cilialis* (Hübner), 20.v.2011; *Catoptria verellus* (Zincken), 16.vii.2011; *Pediasia aridella* (Thunberg), 12.ix.2011; *Assara terebrella* (Zincken), 1.viii.2011; *Antigastra catalaunalis* (Duponchel), 21.viii.2011.

PARSONS, M., STERLING, M. J. & STERLING, P. H. – *Calicotis* sp. (Stathmopodidae). Four of very many moths found on 1.vi.2010 at Abbotsbury Sub-tropical Gardens, SY4684, Dorset (VC9). **New to Britain.** As yet unidentified. The moth is likely to have been imported to the gardens at some point in the past and is now well established. Dr Robert Hoare of New Zealand Landcare Institute believes it is probably native to Australasia or Japan but does not recognise the species. The larvae feed in the sporangia of ferns.

SALISBURY, A. & HALSTEAD, A. J. – *Cydalima perspectalis* (Walker). The box tree moth is a native of East Asia that has recently become established in mainland Europe. The larvae of the moth defoliate box (*Buxus*) plants. Adult moths have been recorded at light traps in parts of England since 2008 and larvae had been reported at one commercial nursery in Surrey in 2008 and 2009. In 2011 larvae of the moth were reported from three private gardens in South East England. In May 2011 the Royal Horticultural Society (RHS) received the first report of larvae in a UK private garden at Stoke Poges, Bucks (SU98); the two specimens on display were reared from larvae received from two other locations in 2011: Nr Harlow, Herts, TL41, caterpillar received 25.v.2011 adult emerged 16.vi.2011; Buckhurst Hill, S. Essex, TQ49, two larvae received 23.viii.2011 adults emerged 11.ix.2011. A written account of the records is in preparation (BJENH 25 (2012): 1–5). The RHS wants to track the spread of this pest in Britain. If you have any records of adults or larvae on box, please send details to advisory_entomology@rhs.org.uk.

SIMS, I. – (1) An exhibit demonstrating the utility of leaf-litter sieving as a winter collecting technique. Sieving was undertaken underneath deciduous trees using a coarse plastic garden sieve, a sheet and a scoop, in sessions of about half-an-hour. The sievings were kept in plastic vivaria and lightly sprayed with water. In addition

to the Lepidoptera listed, there were also numerous craneflies, ground-beetles, 'staphs' and the silphid *Dendroxena quadrimaculata* (Scopoli). *Incurvaria masculella* (D. & S.), *Nemophora degeerella* (L.); *Adela cuprella* (D. & S.), *A. reaumurella* (L.), *Heliozela sericiella* (Haworth), *Pseudatemelia* sp., *Endotricha flammealis* (D. & S.) and common footman, *Eilema lurideola* (Zincken) were found this way.

(2) Lepidoptera from Berkshire and Surrey: *Ectoedemia turbidella* (Zeller), adults and cocoons, Jealott's Hill, SU8673, Berkshire (VC22), ex larvae in petioles of white poplar leaves, *Populus alba*, 3.xi.2010, emerged 20.iv.2011. *Stigmella samiatella* (Zeller), adult, Jealott's Hill, SU8673, Berkshire (VC22), ex larva in sweet chestnut, *Castanea sativa*, 31.x.2010, emerged 9.iv.2011. *Opostega salaciella* (Treits.), Rothamstead trap, Site No. 662, Jealott's Hill, SU8673, Berkshire (VC22), 19.vii.2011. *Caloptilia leucapennella* (Stephens), Jealott's Hill, SU8673, Berkshire (VC22), 21.x.2011, four colour forms beaten from leyland cypress, X *Cupressocyparis leylandii* and yew *Taxus baccata*. *Phyllonorycter comparella* (Duponchel) adults, Jealott's Hill, SU8673, Berkshire (VC22), ex mines in leaves of white poplar, *Populus alba*, 28.ix.2011, emerged 5.x.2011, also from Dinton Pastures, Hurst, SU7871, Berkshire (VC22), 24.ix.2011, emerged 1.x.2011. *Yponomeuta malinellus* Zeller, adults, larval web, cocoons and pupae, Jealott's Hill, SU8673, Berkshire (VC22), ex larvae on apple, *Malus domestica* cultivars, 17.v.2011, emerged 7.vi.2011. Five larval webs were seen on several trees, containing around 200 larvae in total. In many areas this species is very much rarer than its closest allies *Y. cagnagella* (Hübner), and *Y. padella* (L.). *Yponomeuta irrorella* (Hübner), adults, larval web, cocoons and pupae, Lower Earley, SU7570, Reading, Berkshire (VC22), ex larvae on spindle, *Euonymus europaeus*, 2.v.2011, emerged 5.vi.2011, new for VC. *Acrolepiopsis assectella* (Zeller), leek moth, adults, cocoons and pupae, Winnersh, SU7770, Reading, Berkshire (VC22), ex larvae in onion, *Allium* sp., 20.viii.2011, emerged 19.ix.2011. Also from Wood Street Village, Pirbright, SU9456, Surrey (VC17), emerged 6.x.2011. *Pammene aurana* (Fabr.), adults and cocoons with pupae, Jealott's Hill, SU8673, Berkshire (VC22), ex larvae on green seeds of hogweed, *Heracleum sphondylium*, emerged 8.viii.2011. *Pyrausta despicata* (Scopoli), Moor Green Lake Nature Reserve, Finchampstead, SU8062, Berkshire (VC22), 9.vii.2011, *Phycitodes maritima* (Tengström), adults, larval feeding and pupae, Moor Green Lake Nature Reserve, Finchampstead, SU8062, Berkshire (VC22), 9.vii.2011, emerged 25.vii.2011, confirmed by genitalia determination.

THIRLWELL, I. R. – Two uncommon migratory and very similar plume moths: *Oxyptilus distans* (Zeller), Portsmouth SU6700, South Hants (VC11), 8.viii.1997, mv; *Crombrugghia laeta* (Zeller), Portsmouth SU6700, South Hants (VC11), 30.vi.2011, mv.

WHEELER, P. R. – Moths from Pewley Down, TQ0048, nr Guildford, Surrey (VC17). *Caloptilia cuculipennella* (Hübner), 28.vii.2011; *Caloptilia syringella* (Fabr.), 3.vii.2011; *Coleophora therinella* Tengström, 3.vii.2011, genitalia determination, Notable B; *Elachista biatomella* (Stainton), 3 & 28.vii.2011; *Elachista argentella* (Clerck), 6.v.2011; *Elachista triatomea* (Haworth) 6.v.2011; *Elachista subocellea* (Stephens), 6.v.2011; *Depressaria chaerophylli* Zeller (first Surrey record since VCH), 11.iv.2011, netted at dusk, leg. S. Foote, genitalia determination; *Metzneria neuopretella* (Zeller) 29.vii.2010 & 28.vii.2011, mv, determined M.Honey et al., RDB2; *Recurvaria leucateella* (Clerck), 3.vii.2011, Notable B; *Spuleria flavicaput* (Haworth), 6.v.2011; *Sorhagenia lophyrella* (Douglas), 3.vii.2011, Notable A; *Isotrias rectifasciana* (Haworth), 6.v.2011, determined J. Porter; *Pelochrista caecimaculana* (Hübner), Notable B, 3.vii.2011; *Pempelia obductella* (Zeller), 29.vii.2010, pRDB2; *Hypochalcia ahenella* (D. & S.), 6.v. & 2.vi.2011; *Merrifieldia baliodactyla* (Zeller), 29.vii.2010 (two), genitalia confirmation.

CHANNEL ISLANDS LEPIDOPTERA

HECKFORD, R. J. – Two Microlepidoptera species new to Channel Islands. *Agonopterix bipunctosa* (Curtis), east of Le Creux de Lasse, St Mary, Jersey WV593553 (VC113), larva in rolled leaf of *Serratula tinctoria* 4.vi.2011, moth reared 2.vii.2011. *Acroclita subsequana* (H.-S.), La Corbière, St Brelade, Jersey WV552479 (VC113), larvae in spun flower heads of *Euphorbia portlandica* 7.vi.2011, moths reared 27 & 28.vi.2011.

FOREIGN LEPIDOPTERA

HALL, N. M. – Moths from the Canary Islands. (1) Bred specimens. (i) *Trichoplusia ni* (Hübner), The Ni moth, bred ex female {28.iii.2011 to MVB}, Maspalomas, Gran Canaria, all emerging v.2011. Uppersides and undersides of both males and females were exhibited. (ii) *Ethmia quadrinotella* Mann, bred ex larvae collected iii.2011, feeding on *Heliotropium erosum* (Boraginaceae), a common weed, at Maspalomas, Gran Canaria. The *Heliotropium* is about 12 cm high: the larva is only about 6 mm long but is fairly easy to see against the white petals. *Ethmia quadrinotella* is very similar to *E. terminella* Fletcher, which turns up occasionally in the UK (as could *quadrinotella*. It only has to come from Mediterranean North Africa). NMH has found the tiny larvae sitting on the white flowers of *Heliotropium* several times, and tried to breed them through to find out what they are, but had only previously obtained parasitoids. Two parasitoids were obtained this time also, which were Campopleginae (Ichneumonidae) in the group of genera that includes *Campoplex* and *Diadegma*, a very difficult group to identify (M. Shaw, pers. comm.). The exhibit comprised one bred moth and photographs of a larva and the foodplant. (iii) *Phycita diaphana* Staudinger, bred ex larvae on *Ricinus* (castor-oil Plant), collected 28.iii.2011, Fataga Gorge, Maspalomas, Gran Canaria. Two larvae produced one moth, and one parasitoid, again in the group of genera that includes *Campoplex* and *Diadegma*. (iv) *Ctenoplusia limbirena* (Guenée), Scar Bank Gem, 27.iii.2011, Maspalomas, Gran Canaria (MVB). Eggs were obtained from the specimen exhibited. NMH was surprised to find that the first instar larvae were white. Unfortunately, he was unable to get the larvae home. (2) Other specimens: (i) *Hydriris ornatalis* Duponchel, 27.iii.2011, Maspalomas, Gran Canaria (MVB). (ii) *Diplopseustis perieresalis* Walker, a male, 8.vi.2003, El Torn, L'Hospitalet, Tarragona, Spain (MV), a female, 17.iii.2011, Maspalomas, Gran Canaria (MVB). This adventive species has been reported from Tenerife and La Gomera on the Canary Islands according to Speidel *et al.* (*Nota lepid.* 29(2006): 185–192) but not from Gran Canaria. NMH did not recognise the female when he saw it on Gran Canaria, because the male he had seen in Spain looked so different. (iii) *Stathmopoda auriferella* Walker, 28.iii.2011, Maspalomas, Gran Canaria, (MVB) – or at least a *Stathmopoda* sp. This moth is common on all the Canary Islands NMH has visited. It is described in Koster & Sinev (Microlepidoptera of Europe 5, Momphidae *sensu lato*), which says it is widespread in Afrotropical regions, but does not indicate that it occurs in the Canaries in its distribution charts. (iv) *Glossotrophia asellaria* (H.-S.), 17.iii.2011, Maspalomas, Gran Canaria (MVB). This was the first time NMH had seen a *Glossotrophia* sp. on Gran Canaria. They are easily recognised by the continuous line in the fringes, which goes round the apex of the forewings (though *Scopula submutata* (Treit.) does likewise). (v) *Heliothis nubigera* (H.-S.), eastern bordered straw, 5.xii.2010, Costa Calma, Fuerteventura (at a street light). (vi) An *Opogona* sp., 28.iii.2011, Maspalomas, Gran Canaria (MVB) (vi) *Agrotis trux*

(Hübner), Crescent Dart, xi & xii.2010, Costa Calma, Fuerteventura. This is usually the commonest noctuid to come to light in the Canaries. Three were shown that seemed to 'stand out' from the commoner forms.

STERLING, M. J. – Microlepidoptera from Hong Kong SAR, People's Republic of China, 2010. (i) *Ethmia susa* Kun & Szaboky, Ethmiidae, second known specimen, Kadoorie Institute, Hong Kong New Territories, 8.x.2010 at mv light. This species was known previously only from the female holotype taken in Taiwan in 1997. The wing patterns of Asian ethmiids are distinctive and although this specimen is a male there is little doubt it is the same species. (ii) *Niphopyralis* sp. Wurthiinae, Pyralidae, an undescribed species, Kadoorie Institute, Hong Kong New Territories 6.ix to 17.x.2010 at mv light. Wurthiids are an extraordinary group within Pyralidae. The adults resemble limacodids and even have the same resting posture but they have tympanal organs and pyralid wing venation. Their larvae are predators on the eggs and larvae of various species of tree ant but appear to be tolerated by the ants, which is remarkable given the generally vicious behaviour of tree ants. (iii) *Eretmocera impactella* Walker, Scythrididae. A striking species of scythrid found on waste ground at several sites in the Lam Kam Valley, Hong Kong New Territories. The adults can be found by day resting on flower spikes of *Amaranthus spicata* (Indian spinach), a fairly common plant on recently disturbed waste ground in Hong Kong and South China. The species is also known from India (where it has been bred from *Amaranthus viridis*), Sri Lanka, Thailand and Malaysia.

WARING, P. M. – Moth and butterfly recording in tiger country, Assam and Arunachal Pradesh, north east India, May 2011. In May 2011 PMW had the opportunity to tour north east India recording moths and butterflies with fellow lepidopterist Sanjay Sondhi. The exhibit was essentially a selection of photographs from the trip, to give a flavour of the habitats, light trapping conditions, numbers of moths and some of the more striking species of Lepidoptera encountered. Species featured included: at Eaglenest Camp (N27°09'25.1" E092°27'39.6") on 19.v.2011, *Brahmidia hearseyi* (White) and Indian death's head hawk moth *Acherontia lachesis* (Fabr.); at Pakke Tiger Reserve: Indian purple emperor *Mimathyma* (*Apatura*) *ambica* (Kollar) imbibing at a bird dropping on a rock by a forest stream (N27°01'35.9" E093°02'44.7") on 16.v.2011, plus Five barred swordtail *Graphium antiphates* (Cramer) and a long tailed lycaenid found at the same location. Also shown were Sanjay Sondhi with a troop of Indian students who joined them at the Eaglenest Camp for part of the trip, plus some local people watching a wild mother elephant and her baby crossing a shallow river at Pakke.

DIPTERA

ALEXANDER, K. N. A. – Two scarce craneflies (Tipulidae) found during 2011: *Nephrotoma crocata* (L.) (RDB3), River Dart (SX6772), below Dartmeet, S. Devon, VC 3, one at rest at the grassy edge to a sandy hollow, 14.vi; *Tanyptera atrata* (L.) (Nationally Scarce), Tatton Park (SJ7481), Cheshire, VC58, one knocked from aerial dead branches of a collapsed parkland oak *Quercus*, 19.v.

DICKSON, R. J. – Some uncommon Diptera found in 2011: *Ctenophora pectinicornis* (L.) (Tipulidae), Pigeonhouse Copse (SU5909), near Wickham, S. Hants (VC11), 16.v, ♀ leg. K. J. Coker; *Stratiomys longicornis* (Scop.) (Stratiomyidae) Sandy Point LNR (SZ7498), Hayling Island S. Hants (VC11), 9.viii, flying over ragwort *Senecio* flowers; *Stratiomys singularior* (Harris) (Stratiomyidae), Thorney Island, West Sussex (VC13), 9.viii, by sweeping along the coastal bank; *Poecilobothrus principalis* Loew (Dolichopodidae), Sandy Point LNR (SZ7498),

S. Hants (VC11), ♂♀, 9.viii; *Psilota anthracina* (Meig.) (Syrphidae), Denny Wood (SU3306), New Forest, S. Hants (VC11), 25.iv, two ♀♀ of several swept from maple *Acer campestre* blossom; *Orellia falcata* (Scop.) (Tephritidae), Bustard Vedette (SU0946), Salisbury Plain, N Wilts (VC7), 27.vi, swept; *Dorycera graminum* (Fabr.) (Ulidiidae), Cams Bay (SU5905), near Fareham, S. Hants (VC 11), ♀, swept 9.v; *Phasia barbifrons* (Girschner) (Tachinidae), Whitelands Wood (SU7220), near Petersfield S. Hants (VC11), 30.ix, ♀ at mv light; *Zophomyia temula* (Scop.) (Tachinidae), Botley Wood (SU5409), S. Hants (VC11), 31.v, on flowers of hemlock water dropwort *Oenanthe crocata*, and Cams Bay (SU5905), S. Hants (VC11), 30.v; *Xylotachina diluta* (Meig.) (Tachinidae), Denny Wood (SU3306), S. Hants (VC11), larva of its host the goat moth *Cossus cossus* (L.) collected 30.viii.2010, fly emerged 26.v.2011, leg. G. R. Else, first British record for many years [also see exhibit by I. Perry below, from same site].

GIBBS, D. J. – Some uncommon flies recorded in 2011: *Asindulum nigrum* Latreille (Keroplatidae), Woodbastwick Fen NNR, VC27, 5.vii; *Grzegorzekia collaris* (Meig.) (Mycetophilidae), Bishop's Stortford, VC 20, 29.vi; *Odontomyia angulata* (Panzer) (Stratiomyidae) (Plate 11, Fig. 9), Woodbastwick Fen NNR, VC27, 4.vii; *Acrocera orbiculus* (Fabr.) and *Ogcodes pallipes* Latreille (Acroceridae), Lankham Bottom, VC9, 11.vii; *Meligramma euchromum* Kowarz (Syrphidae), Bishop's Stortford, VC20, 5.v; *Pseudoseps signata* (Fall.) (Piophilidae), Clatworthy Reservoir, VC5, 25.v, previously recorded in Britain only from the Scottish Highlands; *Stemonocera cornuta* (Scop.) (Tephritidae), Weston Moor, VC6, 27.viii, swept from willow; *Homoneura mediospinosa* Merz (Lauxaniidae), Denny Wood, New Forest, VC11, 31.v; *Pherbellia argyra* Verbeke (Sciomyzidae), Upton Fen NR, VC27, 7.vii.

HALSTEAD, A. J. – Some local or uncommon Diptera taken in 2011: *Ctenophora pectinicornis* (L.) (Tipulidae), RHS Garden (TQ066583), Wisley, Surrey, ♀ inside a building, 10.v, and Blaen y Cwm (SO251285), Mynydd du Forest, Monmouthshire, ♂ swept, 12.v; *Tanyptera atrata* (L.) (Tipulidae), Sheets Heath (SU958572), Brookwood, Surrey, ♀ in a water trap, 2.v; *Xylophagus ater* Meig. (Xylophagidae), Princes Coverts (TQ158611), near Oxshott, Surrey, ♂ swept, 24.iv; *Odontomyia argentata* (Fabr.) (Stratiomyidae) (Plate 11, Fig. 10), Thundry Meadows (SU897438), near Elstead, Surrey, ♂ swept, 29.iv; *Agathomyia woodella* Chandler in Vãnhara (Platypezidae), Park Wood (TQ601124), near Hailsham, E Sussex, ♂ swept, 14.x; *Chrysotoxum arcuatum* (L.) (Syrphidae), Blaen y Cwm (as above), ♂ swept, 12.v; *Acanthiophilus helianthi* (Rossi) and *Campiglossa malaris* (Séguy) (Tephritidae), Thundry Meadows (as above), ♂♂ swept, 3.vii; *Dorycera graminum* (Fabr.) (Ulidiidae), Chinthurst Hill (TQ013458), near Womersley, Surrey, ♀ swept, 4.vi.

HAWKINS, R. D. – Two flies from a yellow pan trap set in 2011 in a small suburban garden at Horley, Surrey: *Empis woodi* Collin (Empididae), ♂ (det. by P. J. Chandler), 4.v, although apparently rare this species has previously been recorded from a garden in Essex; *Lophosia fasciata* (Meig.) (Tachinidae), ♂, 24.vi, a parasitoid as a larva of shield bugs, this fly has a hugely expanded and triangular third antennal segment in the male.

HODGE, P. J. – *Ctenophora flaveolata* (Fabr.) (Tipulidae), Box Hill (TQ175522), Surrey, ♀ flying close to the ground in shaded deciduous woodland, 21.iv.2011; there are few Surrey records for this RDB2 saproxylic species.

PERRY, I. – A selection of uncommon Diptera found during 2011; *Oedalea hybotina* (Fall.) (Hybotidae), Camghouran (NN536568), Loch Rannoch, Perthshire, 8.vii, ♀ swept from birch woodland; *Pseudopomyza atrimana* (Meig.) (Pseudopomyzidae), Camghouran (as above), 3.vii, ♀ swept from birch woodland and Kings Forest (TL805718), Suffolk, 17.v, several around a stack of pine trunks; *Dasiops*

calvus Morge, 26.vi, *D. spatiosus* (Becker) and *D. trichosternalis* Morge, 19.vi, ♀♀ of these three species of *Dasiops* (Lonchaeidae) on birch logs at Warburg NR (SU715879), Oxfordshire; *Phyllomyza longipalpis* (Schmitz) (Milichiidae), Pondhead Inclosure (SU311071), New Forest, Hants, 4.vi, earlier found in the New Forest by C. G. Lamb in 1904; *Fannia clara* Collin (Fanniidae), Fulbourn Fen NR (TL526565), Cambs, 6.v and Box Hill (TQ181514), Surrey, 30.vii, on both occasions ♂♂ were hovering singly beside large trees; *Lispocephala brachialis* (Rond.) (Muscidae), Kings Forest (TL805718), Suffolk, 20.iv and 17.v, ♂♂ swept from a stack of pine trunks, a surprising record from East Anglia for this mainly western species; *Helina crinita* Collin (Muscidae), Horsell Common (TQ004609), Surrey, 14.viii; *H. pulchella* (Ringdahl) (Muscidae), Warburg NR (SU715879), Oxfordshire, 8.v and 1.vi, ♂♂ swept from shady woodland track; *Xylotachina diluta* (Meig.) (Tachinidae), Denny Wood (SU3405), New Forest, Hants, 10.vi, ♂ on a “*Cossus* oak”, this species is a host specific parasitoid of the goat moth *Cossus cossus* (L.) [also see exhibit by R. J. Dickson above]; *Erycilla ferruginea* (Meig.) (Tachinidae), Tummel Bridge (NN762595), Perthshire, 9.vii, at flowers of ground elder *Aegopodium podagraria* L.; *Linnaemya picta* (Meig.) (Tachinidae) (Plate 12, Fig.1), Lode (TL531626), Cambs, 13.viii, after its recent recognition as British from records in Kent, this was a surprising visitor to the exhibitor’s garden; *Ceranthia abdominalis* (R.-D.) (Tachinidae), Camghouran (as above), 8.vii and Horsell Common (as above), 14.viii, at both localities single ♂♂ were swept from young birch *Betula*.

WEBB, J. – Rare and interesting Diptera and Hymenoptera reared from Oxfordshire Fens: the Oxfordshire calcareous valley fens are home to some interesting Diptera and their breeding habitat preferences and larval stages are not well known. Some of the sites are home to the very rare clubbed general soldierfly *Stratiomys chamaeleon* (L.) (Stratiomyidae). Permission was achieved from Natural England and the Berks Bucks and Oxon Wildlife Trust for the removal of small numbers of larvae or puparia from shallow muddy pools or waterlogged moss mats at Dry Sandford Pit, Parsonage Moor and Cothill Fen NNR (Ruskin Reserve), and the rearing of these through to adults was carried out. The aim was to see in which habitats in the fens the larvae were most frequently found and then to see which species eventually was involved. Larvae identifiable to the genera *Stratiomys* and *Odontomyia* plus some Tabanidae were found by hand searching through waterlogged moss or by sieving pool mud during May 2011. These larvae were set up in shallow tubs containing some of the source medium, either waterlogged moss mat or calcareous mud. A net over the tub retained any emerging adults and the tubs were checked daily throughout June and July as the flies emerged.

The exhibit comprised mounted flies with exuviae, including examples of adult *Stratiomys potamida* (Meig.) (Nationally Scarce) reared from Dry Sandford Pit, *Stratiomys chamaeleon* (RDB1) from Parsonage Moor and the Ruskin Reserve in Cothill Fen NNR. One specimen of *Stratiomys singularior* (Harris) (Nationally Scarce) was reared from Parsonage Moor, a new site record. Some *Stratiomys* type larvae produced not a fly, but the large black chalcid wasp parasitoid, *Chalcis sispes* (L.) (Chalcididae), which was also exhibited. *Odontomyia* type larvae from Parsonage Moor and the Ruskin Reserve all produced *O. angulata* (Panzer), the orange-horned green colonel soldierfly. Tabanid larvae and puparia from the Ruskin Reserve produced adults of the golden horsefly *Atylotus fulvus* (Meig.), here a long way from its stronghold in the New Forest, Hants. Photographs of all stages from larva through to adult were presented for *Atylotus fulvus* and *Stratiomys chamaeleon*.

COLEOPTERA

ALEXANDER, K. N. A. – Beetles from sites across England and Scotland. *Poecilus kugelanni* (Panzer) (Carabidae), on slopes below Aish Tor, Dart Valley Nature Reserve, Dartmoor, S. Devon (VC3), SX7070, seven taken in pitfall traps, 22.vii.2011, a known site for this RDB1 & BAP species. *Plegaderus dissectus* Erichson (Histeridae), decaying wood, Tatton Park, Cheshire (VC58), SJ7481, 17.v.2011, and Styal Woods, Cheshire (VC58), SJ8283, 28.vii.2011, at northern edge of UK range. *Denticollis linearis* (L.) (Elateridae), Broadaford Farm Bog, Dartmoor S. Devon (VC3), SX6977, 4.vii.2011, an exceptionally small female. *Cantharis paludosa* Fallén (Cantharidae), Pizwell Bog, Dartmoor, S. Devon (VC3), SX669787, 4.vii.2011, very few records from SW England. *Rhagonycha translucida* (Krynicky) (Cantharidae), Aoineadh Beag Woods, Ardtornish, Westernness, (VC97), NM6943, 3.vi.2011, Nb species not previously reported from this far north in UK. *Lymexylon navale* (L.) (Lymexylidae), Tatton Park, Cheshire (VC58), SJ7481, 25.vii.2011, RDB2 species, swept beneath ancient parkland oak. *Tillus elongatus* (L.) (Cleridae), Exminster Marshes RSPB Reserve, S. Devon (VC3), SX9587, 3.vii.2011, one swept by Ken Merrifield on floodplain with old hedgerow oaks, Nb species, first Devon report for over 100 years. *Ropalodontus perforatus* (Gyllenhal) (Ciidae) Glen Tarff, Easternness (VC96), NH3805, 31.v.2011, from *Fomes fomentarius* brackets on dead birch stems, RDB3 species. *Tetratoma desmarestii* Latreille (Tetratomidae), Tatton Park, Cheshire (VC58), 3.x.2011, knocked from aerial dead branches on parkland oaks, Na species. *Abdera biflexuosa* (Curtis) and *A. quadrifasciata* (Curtis) (Melandryidae), Tatton Park, Cheshire (VC58), knocked from aerial dead branches on old parkland oaks, 21.vi.2011, Nb and Na species respectively, both at northern edge of UK range. *Bolitophagus reticulatus* (L.) (Tenebrionidae), Glen Tarff, Easternness (VC96), NH3805, from *Fomes fomentarius* brackets on dead birch stems, 31.v.2011, RDB3 species. *Platydemus violaceum* (Fabr.), this RDB1 species was taken in Lincolnshire by John Lamin, apparently increasing in the east of England, possibly representing a new colonisation from continental Europe. *Scraptia testacea* Allen (Scraptiidae) Girton, Cambridgeshire (VC29), TL4260, swept from ancient oak pollard, 12.vii.2011, a new vice county record for this RDB3 species. *Agelastica alni* (L.) (Chrysomelidae), River Bollin, Styal Woods, Cheshire, VC58, 5.x.2011 and Tatton Park Brook, Cheshire (VC58), 4.x.2011, abundant on alder foliage, RDBK species. *Bruchela rufipes* (Olivier) (Anthribidae), development site at Merebank, Avonmouth, W. Gloucestershire (VC34), ST5279, numerous on *Reseda lutea*, 27.vi.2011, new vice county record. *Trachodes hispidus* (L.) (Curculionidae), Dart Valley Nature Reserve, S. Devon (VC3), swept, 14.vi.2011, Nb species. *Anthonomus conspersus* Desbrochers (Curculionidae), Glen Tarff, Easternness (VC96), 31.v.2011, Nb species. *Magdalis carbonaria* (L.) (Curculionidae), swept Dart Valley Nature Reserve, S. Devon (VC3), swept, 14.vi.2011, new vice county record for this Nb species. *Mitoplinthus caliginosus* (Fabr.) (Curculionidae), Blean Wood, E. Kent (VC15), TR087609, amongst leaf litter, 16.iv.2008, this Nb species was collected by Steve Gregory. *Pityogenes quadridens* (Hartig) (Curculionidae), Coille Coire Chuilc SSSI, Tyndrum, Stirlingshire (VC86), NN3227, reared from freshly fallen small pine boughs collected, 4.vi.2011, Na species.

BOOTH, R. G. – A few captures including some new records. *Aleochara binotata* Kraatz (Staphylinidae), Burnham Overy Staithe, West Norfolk, TF8545, sieved from dog dung on sand dunes at Gun Hill, 3.viii.2010, another record from the north Norfolk coast for this rarely-recorded species. *Ampedus rufipennis* (Stephens) (Elateridae), Laleham, Middlesex, TQ0669, a single male on netting at edge of wood,

21.v.2011, possibly a new record for Middlesex. *Meligethes matronalis* Audisio & Spornraft (Nitidulidae), Bookham Common, Surrey, TQ1255, sweeping low vegetation on Central Plain area, 17.v.2011, a species new to Britain which has been spreading in Europe, often associated with dame's violet, *Hesperis matronalis* L., on the continent. *Telmatophilus brevicollis* Aubé (Cryptophagidae), Haseley Manor, Arreton, Isle of Wight, SZ546857, sweeping pool-side vegetation, including *Sparganium*, in marshy area, 22.vi.2011, a new record for the Isle of Wight. *Bradybatus fallax* Gerstaecker (Curculionidae), Merton Park, Surrey, TQ2569, a single male found resting on the roof of my green-coloured car in a colleague's driveway in late afternoon, 13.viii.2011, a species new to Britain, associated with *Acer* species, including sycamore, *A. pseudoplatanus*, on the continent.

DICKSON, R. J. – Ash bark beetle *Hylesinus varius* (Fabr.) (Scolytidae), Roughay Farm near Marwell, South Hants (VC11), SU5221, this beetle was coming into a house in very large numbers, 8.ix.2011, leg. K. J. Coker. *Necrobia violacea* (L.) (Cleridae), Fareham, South Hants (VC11), SU579069, in Malaise trap, 21.v.2011. *Ampedus quercicola* (du Buysson) (= *pomoniae* sensu auctt.) (Elateridae), Denny Wood, New Forest, South Hants (VC11), SU3306, on dead beech, 2.v.2011. *Odonteus armiger* (Scopoli), Denny Wood, New Forest, South Hants (VC11), SU3306, male at mv light, 6.v.2011. *Ptinus sexpunctatus* Panzer (Anobiidae), Wickham Common, South Hants (VC11), SU5810, bred from a 'bee box' set out the previous year which had been used by *Osmia rufa*, *Heriades truncorum* and *Hylaeus pictipes*, 18.iii. and 22.v.2011 leg. Kevin Coker & Keith Wheeler. *Cionus longicollis* (Brisout) (Curculionidae), Oxenbourne (now part of Queen Elizabeth Country Park) near Petersfield, South Hants (VC11), SU7118, on Hoary Mullein, 11.vii.2011, *C. hortulanus* (Fourcroy) shown for comparison. *Galeruca tanacetii* (L.) (Chrysomelidae), Wickham Common South Hants (VC11), SU5810, 7.vi.2011, present in huge numbers. *Cordylepherus viridis* (Fabr.) (Malachiidae), Thorney Island, West Sussex (VC13), SU7504, 9.viii.2011, showing colour change to dull greenish violet at the end of the season. Spanish fly *Lytta vesicatoria* (L.) (Meloidae), Castlehaven campsite near St. Catherine's Point, Isle of Wight (VC10), SZ5075, 11.vi.2011, leg. Trevor Codlin (who reported that several were seen there (Plate 12, Fig. 6). *Stictoleptura scutellata* (Fabr.) (Cerambycidae), Denny Wood, New Forest, South Hants (VC11), SU3306, 24.v.2011, leg. K. J. Wheeler.

HALSTEAD, A. – Some local or uncommon Coleoptera taken in 2011. *Dendroxena quadrimaculata* (Scopoli) (Silphidae), Royal Common, near Elstead, Surrey, SU921425 swept, 29.iv.2011. *Agrilus sulcicollis* Lacordaire (Buprestidae), Princes Coverts, nr Oxshott, Surrey, TQ158611, on an oak log, 30.v.2011. *Ischnomera sanguinicollis* (Fabr.) (Oedemeridae), Princes Coverts, near Oxshott, Surrey, TQ158611, swept, 24.iv.2011. *Rhyzobius chrysomeloides* (Herbst) (Coccinellidae), RHS Garden, Wisley, Surrey, TQ062581, on *Pinus sylvestris*, 21.ix.2011. *Pycnomerus fuliginosus* Erichson (Colyiidae), Knaphill, Woking, Surrey, SU964587, inside a house, 15.vi.2011. *Grammoptera ustulata* (Schaller) (Cerambycidae), Thundry Meadows, near Elstead, Surrey, SU894442, swept, 29.iv.2011. *Obrium brunneum* (Fabr.) (Cerambycidae), Princes Coverts, near Oxshott, Surrey, TQ158611, on dogwood flower, 30.v.2011. *Donacia bicolora* Zschach (Chrysomelidae) Thundry Meadows, near Elstead, Surrey, SU897438, swept from river bank, 29.iv.2011.

HENDERSON, M. – Some beetle records, including three from the late 20th century. Being an amateur entomologist, as I grow older I have less time to collect than I did. The first three Welsh records have become almost 'historical' in my lifetime. *Melandrya caraboides* (L.) (Melandryidae), near Pysgodlyn, Monmouthshire, a few miles west of Abagavenny, 11.v.1971, in rotting wood. *Conopalpus testaceus* (Olivier)

(Melandryidae), near Pysgodlyn, Monmouthshire, a few miles west of Abagavenny, SO265155, by beating oak, 6.vii.1985. *Clivina collaris* (Herbst) (Carabidae), found under stone near a riverbank, about 2 miles from Pysgodlyn Farm, 27.iv.1973. This season's records are mostly from the Itchen river bank in Hampshire, the Shawford – Winchester section. *Agapanthia villosoviridescens* (De Geer) (Cerambycidae), near Shawford, on stem of umbellifer bank of River Itchen, in warm weather, 29.vi.2011. *Anthocomus rufus* (Herbst) (Malachiidae), from two locations, near Shawford, bank of River Itchen, several seen on umbellifers, 1.ix.2011 and near entrance to Morden Hall Park, Merton Abbey, Colliers Wood, south-west London (Surrey, VC17), 7.viii.2011.

HODGE, P. J. – Fourteen species of Coleoptera recorded from south-east England during 2010 and 2011. *Anisotoma castanea* (Herbst) (Leiodidae), Five Hundred Acre Wood, Ashdown Forest, East Sussex, TQ485335, in powdery slime fungus, vii.2011, collected by D. Hance, the first British record outside the Scottish Highlands. *Coryphium angusticolle* Stephens (Staphylinidae), Nuns Wood, St Osyth, North Essex, TM11631694, beaten off willow twigs, 23.iv.2010. *Tachyporus obtusus* (L.) (Staphylinidae), Coole Nature Reserve, Gort, Co Galway, Ireland, M43770442, by sweeping along a woodland path, 22.v.2010, an unusual colour form of this common species. *Zyras haworthi* (Stephens) (Staphylinidae), Parham Park, West Sussex, TQ06091479, swept off bracken beneath ancient oak tree, 2.vi.2010, the first Sussex record. *Agrilus cyanescens* Ratzeburg (Buprestidae), Hillesden, Preston Bissett, Buckinghamshire, SP6730, two examples seen on bramble flowers on old trackway between lines of trees, 6.vii.2011, collected by M. Edwards, the first Buckinghamshire record. *Paraphotistus nigricornis* (Panzer) (Elateridae), Coole Nature Reserve, Gort, Co Galway, Ireland, M43270428, abundant by sweeping by the River Coole, 22.v.2010, the second Irish record. *Ampedus cardinalis* (Schiodte) (Elateridae), St Osyth, North Essex, TM12061624, beaten off foliage of ancient oak, 25.vi.2010, a new site for this rare species. *Melanotus punctolineatus* (Pelerin) (Elateridae), Lewes, East Sussex, TQ41761028, on wall of bus station, 17.v.2011, the first Sussex record. *Trinodes hirtus* (Fabr.) (Dermestidae), St Osyth, North Essex, TM11891635, swept beneath ancient oak, 25.vi.2010, the first Essex record. *Nephus quadrimaculatus* (Herbst) (Coccinellidae), Lewes, East Sussex, TQ41450961, one beaten off ivy in grounds of priory ruins, 12.x.2011, the first Sussex record. *Psyllobora vigintiduopunctata* (L.) (Coccinellidae), Warwick Gardens, Peckham, South London (Surrey VC17), TQ337762, 29.ix.2011, an unusual dark colour form of this common ladybird. *Agapanthia villosoviridescens* (De Geer) (Cerambycidae), Chingford Pond, Burton, West Sussex, SU97171737, swept off lakeside vegetation, 24.vi.2011, the first Sussex record. *Diaperis boleti* (L.) (Tenebrionidae), Nuns Wood, St Osyth, North Essex, TM11691657, in *Polyporus* on recently fallen ancient oak tree, 26.vii.2010. *Cassida nebulosa* (L.) (Chrysomelidae), Parham Park, West Sussex, TQ05961478, swept off rushes in damp grassland, 25.vii.2011, the first Sussex record.

JAMES, T. J. – Coleoptera from Hertfordshire: a range of more important specimens that have come to notice during 2010-2011, either collected by myself, or provided by others. Many are new records for the county, as far as can be ascertained from data held by me. All these specimens, along with other new and important records, are in process of publication (2011) in the *Hertfordshire Naturalist*, published by the Hertfordshire Natural History Society. *Oodes helopioides* (Fabr.) (Carabidae), Sawbridgeworth Marsh, TL41, 10.vii.2010, Coll. TJJ, first Herts. record for this Nb species since the 1930s, natural swamp wetlands are now a rare habitat in the county. *Cryptopleurum crenatum* (Kugelann) (Hydrophilidae), Symondshyde Wood, TL11, 25.vi.2010, Coll. TJJ, the second

Herts. record for this Notable species, only otherwise recorded in 1940. *Euconnus maeklini* (Mannerheim) (Scydmaenidae), Marshall's Heath, TL11, in malaise trap, 29.vi.2003, Coll. J. B. Murray (det. TJJ, 2010; conf. R. G. Booth 2011), the second Herts. record, this RDBI species is apparently not as rare as published records suggest, first recorded in the county from St Albans in the 1930s. *Eutheia schaumii* Kiesenwetter (Scydmaenidae) Marshall's Heath, TL11, in malaise trap, 30.x.2005, Coll. J. B. Murray (det. TJJ, 2010); the first in Herts. since 1943. *Gnypeta rubrior* Tottenham (Staphylinidae), Withey Beds Nature Reserve, Rickmansworth, TQ09, 25.vi.2010, Coll. TJJ, new to Hertfordshire, the site is a natural swamp, but was historically strongly modified by osier growing. *Neobisnius prolixus* (Erichson) (Staphylinidae), Knebworth Park, TL22, found on drying mud by a pond, 6.vi.2009, Coll. TJJ, the third county record for this RDBK species and the first since 1941. *Platystethus alutaceus* Thomson (Staphylinidae), Kings Meads, Hertford, TL31, 19.vi.2010, Coll. TJJ apparently new to Herts., the site is the largest remaining area of wet, alluvial grazing meadow in the County. *Malthodes guttifer* Kiesenwetter (Cantharidae), Lord's Wood, Ardeley, TL32, 16.vii.2010, Coll. TJJ, first record for this Nb species since 1930, the site is ancient mixed oak/hornbeam and oak/ash/hazel coppice-with-standards on damp clay. *Dasytes plumbeus* (Müller) (Dasytidae) Hoddesdon Park Wood, TL30, 2007, Coll. K. W. Smith (det. T.J.J., 2010). Also since found at Plashes Wood, TL32, 2.vi.2010 by TJJ, the first and second records for Herts for this Nb species. The specimen shown was obtained from windblown material from the canopy of oaks, suggesting it may be a species found high in tree canopies usually, hence overlooked. *Leptophloeus clematidis* (Erichson) (Laemophloeidae), Plashes Wood, TL32, 29.iv.2007, Coll. TJJ (det. R. G. Booth, 2011), apparently rather less rare than its RDB1 UK status would suggest, but scarce nevertheless, new to Herts. Attempts to find it elsewhere where its prey, the scolytid *Xylocleptes bispinus* (Duftschmid) (Curculionidae), occurs have so far failed. *Notolaemus unifasciatus* (Latreille) (Laemophloeidae), Hoddesdon Park Wood, TL30, from samples of 'lop and top' from canopy wood, five specimens were bred out from oak branches, 2008/9. Coll. K. W. Smith (det. TJJ, 2011), a Na species new to Herts. *Osphyra bipunctata* (Fabr.) (Melandryidae), Buckney Wood, Thundridge, TL31, 16.vi.2010, Coll. TJJ, only the second Herts. record for this RDB3 species. This wood is fairly small and surrounded by arable farmland, but has a rich fauna, demonstrating the potential importance of otherwise unrecognised localities. *Colydium elongatum* (Fabr.) (Colydiidae), Hoddesdon Park Wood, TL30, from samples of canopy 'lop and top', 2008/9, Coll. K. W. Smith (conf. TJJ, 2011), a RDB3 species, bred out in numbers, suggesting that this is also mainly a canopy species, therefore perhaps overlooked. *Oedemera virescens* (L.) (Oedemeridae), near Timber Hall, Thundridge, TL31, 16.vi.2010, Coll. TJJ, the second Herts. record for this RDB2 species. The site is not far from Buckney Wood, and the species was first found in Herts. recently at a locality only 7 miles away, suggesting a meta-population locally. *Isochnus sequensi* (Stierlin) (Curculionidae), Singlers Marsh, Welwyn, TL21, present in large numbers on an apparently non-native willow, yet to be positively identified, September 2010, Coll. R. W. J. Uffen (det. TJJ, 2010), the species was not present on nearby crack willows *Salix fragilis*, new to Herts. but known to be increasing elsewhere. *Otiorhynchus aurifer* Boheman (Curculionidae), Ware, TL31, infesting a new house, with *O. sulcatus* (Fabr.), September 2010, Coll. J. Oldham (comm.: K. W. Smith, det. TJJ, 2010), new to Herts. *Polydrusus pilosus* Gredler (Curculionidae), Northaw Great Wood, TL20, 26.vi.2010, Coll. TJJ first Herts. record, generally restricted to northern districts but this site is a relict of a former heathy common with several more northern species present. *Tychius pusillus* Germar

(Curculionidae), Ashwell Quarry Nature Reserve, TL23, 10.v.2009, Coll. TJJ, (det., 2010), the second Herts. record for this Nb species and the first since 1900. At this site, its normal host plant, lesser trefoil *Trifolium dubium* is not present, and it may have been on white clover *T. repens* instead. *Xyleborus monographus* (Fabr.) (Curculionidae), Hoddesdon Park Wood, TL30, 2008/9, Coll. K. W. Smith (conf. TJJ, 2011). At least 45 specimens of this recently arrived species were bred from oak 'lop and top' samples from the canopy. The oaks concerned here are *Quercus petraea* (durmast oak), not normally thought of as the host in Britain. Three male specimens were found alongside the more usual females, perhaps the first record of this sex in Britain.

LEVEY, B. – A problematic female *Calathus* (Carabidae) specimen from Cairngorm. The specimen does not key unambiguously to any of the British *Calathus* species using the keys of Luff (2007) or Lindroth (1974). The dark brown pronotum, black head and elytra and partly dark appendages suggests it might be the melanistic upland form of *C. melanocephalus* (L.) (var. *nubigena* Haliday), but the elytral shoulder lacks a protruding tooth and the elytra are relatively less convex with the eighth elytral interval appearing relatively wide. The overall appearance of the specimen is most like *C. mollis*, but this species appears to be known only from coastal areas of Scotland and is brown not black. The specimen was collected by the author in the car park area near the ski lift of Cairn Gorm, Easternness, NH989062 on 15.vii.2011.

MORRIS, M. G. – (1) Some Rhynchitidae (Curculionoidea) taken in northern Greece and Bulgaria in 2011. Names follow the recent volume 7 of the *Catalogue of Palaearctic Coleoptera* (ed. Löbl & Smetana, 2011), but names more familiar to British coleopterists are included where relevant. *Eumesauletes politus* (Lepelletier & Audinet-Serville), near Olymbiada, Chalkidiki Province, Greece, general beating, 9.v.2011, associated with *Quercus* spp. *Mesauletobius pubescens* (Kiesenwetter), near Olymbiada, Chalkidiki Province, Greece, general beating, 9.v.2011, associated with *Cystus* spp. *Involvulus caeruleus* (DeGeer), near Kosièno, Burgas Province, Bulgaria, beaten from *Prunus* sp., 27.v.2011. *Mecorhis aethiops* (Bach), near Brjastovec, Burgas Province, Bulgaria, general 'tapping', 28.v.2011, this species has been associated with *Helianthemum*, but the plant was not seen at the site. *Mecorhis ungarica* (Herbst), near Miroljubovo, Burgas Province, Bulgaria, beaten from *Rosa* sp. (the usual host), 26 & 28.v.2011. *Neocoenorhinus germanicus* (Herbst), near Krimni, Chalkidiki Province, Greece, general 'tapping', 7.v.2011. *Neocoenorhinus minutus* (Herbst) (*aeneovirens* (Marsham)), near Vrasna, Thessaloniki Province, Greece, beaten from *Quercus coccifera* L., 8.v.2011. *Rhynchites bacchus* (L.), near Miroljubovo, Burgas Province, Bulgaria, beaten from *Prunus* sp., 23.v.2011, this extinct British species was common in several localities in the area. *Tatianaerhynchites* (formerly *Neocoenorhinus*) *aequatus* (L.), near Miroljubovo, Burgas Province, Bulgaria, 26.v.2011, and near Kosièno, Burgas Province, Bulgaria, 27.v.2011, beaten from *Crataegus* sp.

(2) A few species of *Bradybatus* (Curculionoidea, Curculionidae, Anthonominae) (a genus of species associated with *Acer* spp.), taken by the exhibitor except where stated. *B. (B.) creutzeri* Germar, Tribat, Slovakia, n.d., leg. J. Cunev. *B. (B.) kellneri* Bach, Mt. Aurélien, Var, France, beaten from *Acer* sp. in flower, 18.iv.2006. *B. (B.) seriesetosus* Petri, near Tsarkva, Varna Province, Bulgaria, beaten from *A. campestre*, 27.v.2007. *B. (Nothops) elongatus* (Boheman) Mt. Aurélien, Var, France, beaten from *Acer* sp. in flower, 18.iv.2006, a species closely allied to *B. (N.) fallax* Gerstäcker, recently discovered in England by Dr R. G. Booth (see his exhibit); *B. (N.) turcmenicus*, Ter-Minassian, Kopetdag Mts., Turkmenistan, 7.v.1989, leg. M. Kostal.

SALISBURY, A. – The blue mint beetle *Chrysolina coerulans* (Scriba) (Chrysomelidae), specimens from the first breeding population in Britain. Live adult specimens and of *C. coerulans* received by the Royal Horticultural Society's (RHS) members' advisory service, from a garden in Newenden, East Kent (TQ8327) in July 2011.

HEMIPTERA

BANTOCK, T. – *Rhaphigaster nebulosa* (Poda) (Pentatomidae) (Plate 12, Fig. 2), third British record, and *Orientus ishidae* Matsumura (Cicadellidae) (Plate 12, Fig. 3), first British record, collected from lilac in Warwick Gardens, Peckham, London, TQ337762, 23.ix.2011; *Tritomegas sexmaculatus* (Rambur) (Cydnidae) (Plate 12, Fig. 5), Tyland Barn, Maidstone, Kent, TQ754593, viii.2011, *ex* nymph, collected and reared on black horehound, *Ballota nigra*.

BROOKE, S. – Announcement that Sheila Brooke is relinquishing the organisation of the Water Bug Recording Scheme after ten years service. The new scheme organiser will be Tony Cook (tony.cook20@btinternet.com).

DICKSON, R. J. – *Stictopleurus punctatonervosus* (Goeze) (Rhopalidae), Oxenbourne NR (part of Queen Elizabeth Country Park) nr Petersfield SU7118 South Hants (VC11) 11.vii.2011; *Stictopleurus abutilon* (Rossi) (Rhopalidae), Portsdown nr Paulsgrove SU6206 South Hants (VC11) 22.vii.2011; some notes illustrating differences in the pronotum of these two species; *Deraeocoris olivaceus* (Fabr.) (Miridae), Bulford Field SU1845 South Wilts (VC8) 27.vi.2011; *Psallus assimilis* Stichel (Miridae) ♂♂, Cams Bay SU5905 South Hants VC11 30.v.2011, beaten from field maple; *Globiceps fulvicollis* Jakovlev ssp. *cruciatus* Reuter ♀ (Miridae), Portchester Common SSSI SU6206 South Hants (VC11) 25.vii.2011, by sweeping; *Idiocerus laminatus* Flor (Cicadellidae), Cams Bay SU5905 South Hants (VC11) 30.v.2011, by sweeping, although usually on aspen, the foodplant here was almost certainly grey poplar; *Aphrophora costalis* Matsumura (Aphrophoridae) ♂♂, Botley Wood SU5409 South Hants (VC11) 9.x.2011; *Oliarus leporinus* (L.) (Cixiidae), Cams Bay SU5805 South Hants (VC11) 9.v.2011; Assassin Bug *Reduvius personatus* (L.) (Reduviidae) ♂, Romsey SU3323 South Hants (VC11), nymph 20.iv.2011 (adult noted 20.vi.2011), leg. Trevor Codlin.

HODGE, P. J. – Six species of Hemiptera recorded during 2010 and 2011. *Closterotomus trivialis* (L.) (Miridae), Natural History Museum Wild Garden, London (Middlesex, VC21), TQ266790, abundant by sweeping flowery grassland habitat. 22.v.2011, a recent colonist currently confined to a few sites in London. *Acericerus heydenii* (Kirschbaum) (Cicadellidae), St Osyth, North Essex TM117168, beaten off sycamore, 24.viii.2010 and Camberwell Old Cemetery, East Dulwich, south London (Surrey, VC17), TQ348741, 29.ix.2011, a recent arrival in the British Isles. *Adarrus multinotatus* (Boheman) (Cicadellidae), Box Hill, Surrey, TQ179519, in suction sample from south facing chalk grassland, 4.x.2011, an uncommon chalk grassland species. *Synophropsis lauri* (Horváth) (Cicadellidae), Camberwell Old Cemetery, East Dulwich, south London (Surrey, VC17), TQ349742, 29.ix.2011, beaten off foliage of bay tree and Lewes, East Sussex, TQ415096, one beaten off bay in herb garden at the priory ruins, 12.x.2011, the first Sussex record, a recent colonist, associated with bay and ivy. *Ulopa trivia* Germar (Cicadellidae), Box Hill, Surrey, TQ179519, 4.x.2011, in suction sample from south facing chalk grassland, an uncommon chalk grassland species. *Tettigometra impressopunctata* Dufour (Tettigometridae), Box Hill, Surrey, TQ176520, swept off long grass on road verge, 19.viii.2011, an uncommon chalk grassland species.

NAU, B. – *Aphanus rolandri* (L.) (Lygaeidae), Maulden Wood, Bedfordshire, 19.iv.2011, next to climbing corydalis, *Ceratocapnos claviculata* (Fumariaceae); Potton, Bedfordshire, 19.vii.2011, amongst Common Fumitory, *Fumaria officinalis* (Fumariaceae), growing on mostly bare soil margin of wheat crop. Text of exhibit speculated that these are both likely to be foodplants of this species, being in the same plant family.

SALISBURY, A. & HALSTEAD, A. J. – *Aloea australis* Schuh (Hemiptera: Miridae) Royal Horticultural Society's Garden, Wisley, Surrey (VC17) (TQ0659), vii.2011, infesting several pot-grown aloe (*Aloe* spp, Asphodelaceae), first report of this species in Europe and first known breeding population outside South Africa, published account in *BJENH* 24: 217–220.

HYMENOPTERA

BALDOCK, D. W. – *Homonotus sanguinolentus* (Fabr.) collected at Witley Common, Surrey, SU919398, 14.vii.2011, first county record for 97 years. 1♀ of the very rare red form (Plate 12, Fig. 4).

DICKSON, R. J. – *Ophion ventricosus* Gravenhorst, Denny Wood, New Forest, SU3306, S. Hampshire (VC11), 21.v.2010, c.5 to mv light; *Stenamma debile* (Foerster), Botley Wood SU5409, S. Hampshire (VC11), 2 ♂♂ 18/20.ix.2007 and 1 ♂ 20/22.ix.2007, Malaise trap, leg. K. J. Wheeler; *Pteronidea fagi* (Zaddach), Denny Wood, New Forest, SU3306, S. Hampshire (VC11), 21.v.2010, mv light and Hen Wood near West Meon SU6522, S. Hampshire (VC11), 25.vi.2010, mv light; *Micronematus monogyniae* (Hartig), Brownwich cliffs SU5302 S. Hampshire (VC11), 23.iv.2010, by sweeping; *Cimbex connatus* (Schrank), Fareham, SU5707, S. Hampshire (VC11), larva on pavement below *Alnus cordata* 27.viii.2009, leg. Joan Dickson, adult emerged 3.vi.2010.

HALSTEAD, A. J. – Some local or uncommon sawflies taken in 2011. Pamphiliidae: ♀ *Neurotoma saltuum* (L.), ovipositing on *Prunus pendula* leaf, 9.v.2011, RHS Garden, Wisley, Surrey, TQ064582. Tenthredinidae; ♂ *Dolerus triplicatus* Klug, swept, 15.v.2011, Horse Lawn, Forest of Dean, West Gloucestershire, SO630124; ♂ *Macrophya rufipes* (L.), swept, 4.vi.2011, Chinthurst Hill car park, nr Womersley, Surrey, TQ014462; ♂♀ *Hoplocampa ariae* Benson, on flowers of *Sorbus × vagensis* (usual host plant is *Sorbus aria*), 26.iv.2011, RHS Garden, Wisley, Surrey, TQ060580; ♀ *Amauronematus hedstroemi* Malaise, swept, 29.iv.2011, Royal Common, nr Elstead, Surrey, SU921425.

SIMS, I. – Aculeata, Chrysididae. *Chrysis viridula* L., Moor Green Reserve, Finchampstead, Berkshire, 9.vii.2011. Ichneumonidae, Pimplinae. *Paraperithous gnathaulax* (Thom.), one of 6 (all female) reared from larvae of *Morophaga choragella* (D. & S.) (Lep.: Tineidae) mining the bracket fungus *Ganoderma adspersum* on dead beech, Bear Wood, Wokingham, Berkshire, 3.iv.2010. Hatched 1.vi.2010

WHEELER, K. J. – A selection of Pompilidae (spider-hunting wasps) from South Hants VC11 in 2011. *Priocnemis exaltata* (Fabr.), Fareham, SU5808, 3.viii.2011, 2♀♀; *Priocnemis pusilla* Schiodte, Portsdown Hill, SU6207, 22.vii.2011, 1♀; Wickham Common, SU5810, 19.viii.2011, 1♀; *Priocnemis susterai* Haupt, Wickham Common, 11.v.2011, 1♀; Botley Wood, SU5409, 27.iv.2011, 1♂; *Aporus unicolor* Spinola, Portsdown Hill, 22.vii.2011, 2♀♀; *Arachnospila minutula* (Dahlbom), Portsdown Hill, 22.vii.2011, 2♀♀; *Evagetes crassicornis* (Schuckard), Portsdown Hill, 22.vii.2011, 1♀; Wickham Common, 19.viii.2011, 1♀. A selection of Crabronidae (digger wasps) from South Hants VC11 in 2011. *Crossocerus binotatus* Lep. & Brulle, Denny Wood,

SU3306, 3.vi.2011, 1♀; *Crossocerus megacephalus* (Rossius), Denny Wood, 2.v.2011, 1♂; *Crossocerus elongatulus* (Vander Linden), Botley Wood, 4.v.2011, 1♂; *Ectemnius cavifrons* (Thomson), Denny Wood, 1.vi.2011, 1♂; *Ectemnius ruficornis* (Zetterstedt), Denny Wood, 1.vi.2011, 1♂; *Gorytes laticinctus* (Lep.), Funtley, SU5608, 7.vii.2011, 1♀; *Argogorytes mystaceus* (L.), Botley Wood, 4.v.2011, 1♂; *Nysson spinosus* (Forster), Denny Wood, 2.v.2011, 1♂; *Diodontus minutus* (Fabr.), Brownwich Cliffs, SU5103, 1♂.

GENERAL

HONEY, M. – Two drawers of British Lepidoptera selected from the Natural History Museum's new British Synoptic collection. The collection is housed in the Angela Marmont Centre for UK Biodiversity and the aim is to have representative examples of the entire British fauna available for inspection by visitors. This will extend to other orders.

PARSONS, M. S. – Information sheets from Butterfly Conservation.

STUBBS, A. E. – Buglife news and new booklets.

WARING, I. P. – News and highlights from BENHS field meetings held during 2011. Also information on Moth Projects.

SHORT COMMUNICATION

***Chorosoma schillingii* (Schilling) (Hemiptera: Rhopalidae) in Surrey.** – I took two specimens of this highly distinctive bug on Thursley Common, Surrey, part of an extensive area of heathland, on 23 July 2011. In Southwood and Leston (1959), this insect is stated as having a coastal distribution in Britain, occurring inland only on the Breckland of East Anglia. However, in 1967 the bug was found at Peterborough, Northamptonshire (Russell, 1968), and then, over the next three decades, appeared at other inland locations, in East Kent and South Lincolnshire (Kirby, 1984), Warwickshire (Lane, 1988), Cambridgeshire and Huntingdonshire (Kirby, 1991), and Bedfordshire (Nau, 1997). More recently, Jones (2003) reported the insect from two sites in London, at East Ham (South Essex) and Chelsea (Middlesex) on the bank of the River Thames, and commented that the bug had yet to be reported from Surrey, the adjacent county just 200m over the water from the latter site. Hawkins (2003) concurs, and over the last decade the only other inland reports I have seen were from five sites in South-west Yorkshire (Ely, 2006; Flanagan, 2010) and from two more London sites, Erith (West Kent) and Cricklewood (Middlesex) (Jones, 2007). The present site is about 50km south-west from Chelsea and about 40km north from the Sussex coast.

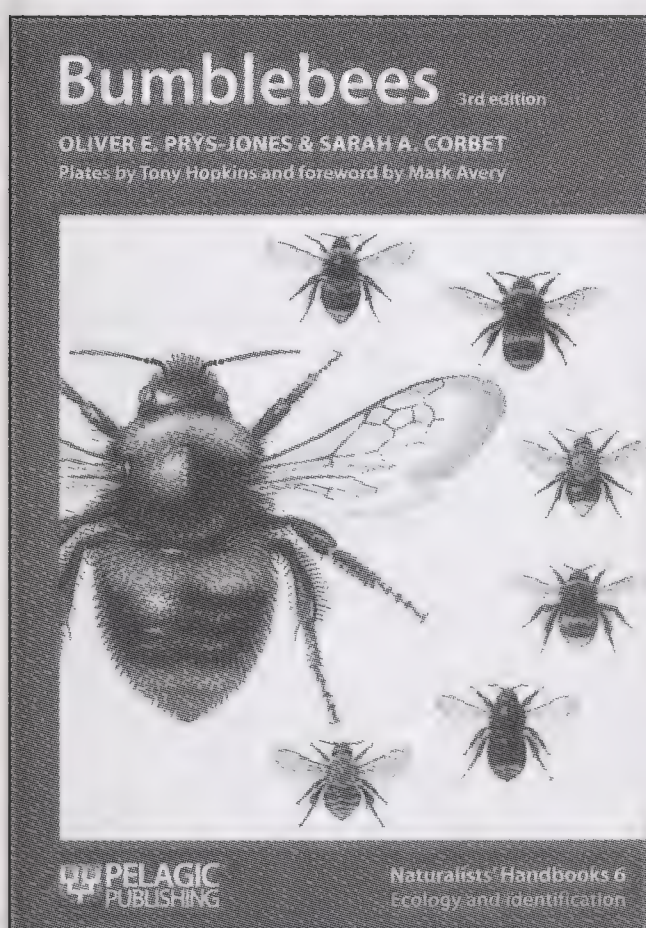
The two specimens were taken by sweeping mixed vegetation along the edge of sandy tracks at two well-separated points along a circular route. The route started at Ordnance Survey grid reference SU897406 and followed the public footpath north towards The Moat, along which the first specimen was taken. Before reaching The Moat, I turned east along the boarded walkway over the bog, and then south along another sandy track. Just before reaching the wide track that would take me west, back to my start point, I found the second specimen.

Images of both specimens have been placed on Flickr (<http://www.flickr.com>) in the photostream RobRyanBugs. – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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BOOK REVIEW



Bumblebees by Oliver E. Prys-Jones and Sarah A. Corbet. Naturalists' Handbooks 6, 3rd Edition, (Pelagic Publishing, 2011). 130 pp. Softback, £19.99. ISBN 978-1-907807-06-0.

A long while ago there was one book on bumblebees, the original New Naturalist volume by Butler and Free. Then came the first Bumblebee Mapping Scheme and *Bumblebees* by David Alford, together with a flurry of interest in academic circles around the ideas of treating bumblebee colonies as model human societies, typified by *Bumblebee Economics* by Heinrich in the USA.

In the UK in the 1970s to 1990s a small group around Sarah (Sally) Corbet, based at Cambridge, produced a number of studies of bumblebee ecology, amongst which was one by Oliver Prys-Jones. This study, together with the background

information needed by Prys-Jones to undertake his study (such as a key to bumblebee species), was based closely on the earlier key in Alford, and became the basis for one of the first volumes of ecological studies in the Cambridge Naturalist series.

This series aimed to promote the relatively new discipline of ecology to the wider public and, at the same time, to engage students with possible research topics. As such the first edition of *Bumblebees* never quite made it into the popular Natural History ratings, although lots of enthusiastic amateurs like myself bought it. I had already bought Alford with its great detail on bumblebee parasitology, but this was of fairly passing interest to one more interested in finding the aculeate Hymenoptera in the field than studies of the inner details of their parasites. I am afraid that I was

similarly unimpressed by the descriptions of removing the honey stomach of a bumblebee in order to find the calorific value of its contents, which, as I had got the key in its original form in Alford, was my over-riding impression of the first edition of the Prys-Jones and Corbet volume. Quite apart from a certain reluctance to ascribe dubious human economic models to wildlife, I didn't have access to the calorimeters required to do such studies myself!

Since then much water has flowed under the bridge and bumblebees have again become a very popular group with the wider British public. Finding and naming bumblebees remains a major avenue of interest and there have been a variety of books and web-based resources servicing this need. Unfortunately, bumblebees are fairly readily recognised as such, but are much harder to name to species. Once one has become adjusted to the idea that accurate naming may well involve having a dead specimen with you and looking carefully at it with a hand-lens or microscope, the need for a taxonomic key becomes paramount.

Alford, expensive though it was, has long been out of print; let alone the rather cheaper reprint of the keys, provided to participants of the original Bumblebee Mapping Scheme (who has got my copy?); the original Cambridge Naturalist Volume, in both its editions, likewise. A very good key, revised from an earlier Essex-based volume, appeared in the very wide-ranging and readable new book on bumblebees in the New Naturalist series by Ted Benton. Like Alford, this volume was priced rather highly, but nevertheless sold out quickly; a victim of a publishing policy unfortunately predicated on a collectors' market, rather than the New Naturalist's first avowed aim of bringing serious natural history studies to the British public.

I was therefore very interested when Oliver and Sally approached the Bees, Wasps and Ants Recording Society (BWARS) about using their data to provide up to date distribution maps for a new edition. After some discussion it was decided to use new date classes for these printed maps, the old 1970 dividing line being somewhat irrelevant in 2010.

When my review copy dropped onto the mat it was not just the maps which gained my interest. The book was over twice the thickness of the original edition (my first edition copy also lost to some past student of bumblebees); clearly there was new material here.

On reading the book I found myself immediately engaged both by the content, a wide but not over-detailed, review of research which has gone on since the first edition, and the writing style; age and experience have served both authors well here. Yes, the energy studies are still there, but they are set within a much broader framework than originally. The key provides understanding of how to separate out the more tricky species and adds the new colonist *Bombus hypnorum*. It still requires a dead specimen for separation of the more awkward species but, as mentioned at the start, this is inevitable with this group of insects.

So, my verdict: once you have decided to get to grips with the more challenging species, and probably would like a bit more ecological meat, this is a very good and affordable introduction to the next stage. Get out and buy it!

MIKE EDWARDS

The Bretherton collection of British and European Butterflies – a family visit. – Russell Bretherton was a well-known authority on British and European Lepidoptera. He was president of this Society in 1967–68 and was subsequently treasurer for a number of years. Many of our older members will recall his regular attendance of indoor and field meetings. An obituary appeared in the Society's journal (Sterling, 1991) and a full bibliography of more than 200 of his publications (Chalmers-Hunt, 1991b) was published in the Entomologist's Record, following a brief obituary and photograph (Chalmers-Hunt, 1991a).

Russell died on 11 January 1991 during the period when our collections and library were in store, although it was already known that we were to move to Dinton Pastures Country Park and the construction of our building began during that year. His collection was bequeathed to the Reading Museum with the provision that the butterflies could be loaned to the Society when our building was completed.



Michael Bretherton (left), Ella Vincent and Isobel Bretherton; curator Peter Chandler behind.

Consequently the five cabinets of British and European butterflies were moved into our building soon after it became operational towards the end of 1992, thanks to the late Brian Baker who was then Curator of Reading Museum's insect collections. Since then the Reading Museum has regularly renewed the loan. As the collection is on loan it was maintained as a separate entity when the other four collections of European butterflies were arranged into a single collection a few years ago. The Museum retained his collection of moths, which is available for examination there.

On 28 April 2012 a visit was made to the Society's building to view Russell Bretherton's collection by three members of his family – his son Michael, Michael's daughter Isobel and her daughter Ella Vincent. The photograph shown here of this visit includes a drawer of swallowtail butterflies from Russell's collection. Also on the table can be seen two items brought along by Michael Bretherton: one of Russell's diaries, covering the period of the late 1940s and his passport from the same period with details of the many countries that he visited. Although both obituaries cited above stated that his diaries were given to the Museum with his collections, a few including this one are still in the possession of his son Michael.

This diary included an account of collecting in the former Czechoslovakia during an international conference at Mariánské Lázně in 1947 (26 April to 10 May) followed by a visit to Prague. Enclosed within it was the manuscript of an article about this visit that was published in the *Entomologist* as 'Spring Butterflies in Bohemia' (Bretherton, 1949), in which his encounters there with *Nymphalis antiopa* (L.) and *N. polychloros* (L.) are described. An internet search revealed that the event he attended was the International Timber Conference, of which a full report may be found on line. This summarises the then current forest resources of each of the many countries represented and their plans to enhance these resources in the future, which might not always bear comparison with the subsequent situation.

From 1939 Russell's career was in the Civil Service and he appears in the list of delegates of the above-mentioned conference as an under secretary at the Board of Trade. He later had a similar role at the Treasury. Apart from the international travel resulting from his work, he also collected widely in Europe and the Middle East. In most cases the butterflies in his collection are arranged within each species under headings of the national origin of the specimens, facilitating comparison between local populations and study of variation across the range of each species.

Michael and Isobel Bretherton were pleased to see the collection again after many years. Michael wrote that it was a joy to see it so well housed and appreciated in such a fitting building and truly entomological atmosphere. Isobel commented that as a child she had spent many hours gazing at those drawers and seeing the collection brought back so many happy childhood memories. They were also interested to see specimens of the Talisker Burnet *Zygaena lonicerae* subspecies *jocelynae* Tremewan. Evidently this subspecies, which was described for the Skye population of this species, was named after Russell's wife Jocelyn. – PETER CHANDLER, 606B Berryfield Lane, Melksham, Wilts SN12 6EL (email: chandgnats@aol.com).

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Rosemary Hill

In January 1952 our then President referred in his address to the fact that the growing status of the Society really demanded a paid secretary or registrar, and bemoaned the fact that our finances would not allow this. Sixty years on, that ambition has been fulfilled and we have our first paid assistant in the person of Rosemary Hill. Who says the Society doesn't act swiftly?

We would like to welcome Rosemary to her post and point out the areas in which she will be assisting Council and the membership. She has been a member of the British Entomological and Natural History Society for twenty years and is well used to our ways, to the exhibition and to Dinton Pastures.

Rosemary will be taking over responsibility for the distribution of the Journal and other notices, relieving Andrew Halstead from this somewhat thankless task that he has carried out, largely unsung, for some time. She will assume responsibility for organising the Exhibition and Annual Dinner following Mike Simmons' retirement from this post at this year's AGM.

Rosemary is not taking over as Secretary of the Society, we are still actively seeking an Honorary Secretary after John Muggleton retired earlier this year. The role of Secretary is considerably less arduous now, however.

Rosemary's primary concern will be taking minutes and assisting with Council meetings which should make us all more efficient. Communication is ever more important and Rosemary will be the primary point of contact for members and non-members seeking information and for those wishing to impart information, for inclusion in the website for example, changes of address and so on.

It would be appreciated if contact could be by email if at all possible, enquiries@benhs.org.uk; please only use the telephone if unavoidable.

Rosemary will be attending the Annual Exhibition and I would hope that those of you who do not know her already will introduce yourselves then.

So do not forget to check the website for updates on meetings and activities and to let Rosemary know if there is something you think we should include. You may also like to contribute to our Facebook site which also includes details of some events and is an ideal forum on which to share pictures of insects you may have encountered on Field Meetings.

So, welcome to Rosemary and please contact her with your views and suggestions for improving the Society and helping to promote entomology.

TONY PICKLES

FIELD MEETING REPORTS

Browndown North and the Alver Valley, Rowner, nr Gosport, Hampshire, 11 June 2011

Leader: **Stephen Miles**. – Fortunately the weather was dry for this joint meeting of the British Entomological and Natural History Society and Alton Natural History Society. A number of local experts of both societies assembled at the Grange Farm meeting place in the morning. The old oak groves including Carter's Copse was the first habitat visited, here yellow shell moth, comma and small tortoiseshell butterflies, the latter worthy of mention these days because of its declining status, were active and harlequin and seven-spot ladybird beetle larvae were abundant. A blackcap was also seen. In the heathland of the MOD's Browndown (North) site, green woodpecker and a small heath butterfly were noted. The hoverflies *Helophilus trivittatus* (Fabr.) and *Dasysyrphus tricinctus* (Fallén) were also frequent on the heath. Tony Dobson recorded the small white wave, *Asthenia albulata* (Hufn.), a new site locality for this moth.

In the southern shrubby part of Browndown North, Tony Dobson found two specimens of the tortricid *Cydia fagiglandana* (Zeller). The caterpillar of this is a beech mast feeding species but there is not much beech on site. More interestingly he also found another more local micro moth namely *Epinotia signatana* (Douglas), which in the larval state feeds on *Prunus*, *Malus* and *Crataegus* and so is a much more typical resident of this area.

Within the reed-bed areas of the fen nearest the southern main road boundary the party debated on the cause of the viral disease or fungal infection that was damaging the tips of the leaves of goat willows. Oak trees were also observed to be dying, possibly because tidal salt water had been let into the fen areas. An alternative explanation was the drainage fed water table had been raised. But from his experience of walking through the fen areas and not getting his boots wet Tony Dobson wondered whether the real problem was simply a lack of water due to the drought!

Also observed in this fen was an example of a micromoth *Hedya salicella* (L.) that resembles a bird dropping, found perched on guelder rose and quite difficult to spot until pointed out. A pupa of a common bagworm *Psyche casta* (Pallas) was found inside its case. Two white admiral butterflies were observed flying by. Stuart Ball found galls of the chloropid fly *Lipara lucens* Meigen were still present on *Phragmites* reed stems, even though adults of this species were numerous and had probably emerged a while ago.

Beside the western edge of the heath examples of the solitary wasps *Cerceris rybyensis* (L.) and *Oxybelus uniglumis* (L.) were found in the wayside grassland areas. Chiffchaff and greenfinch were present in the mature oaks of the north west part of the heath. Butcher's broom *Ruscus aculeatus* was also present, a common plant here in south Hampshire but scarce in the north of the county. The leader found a specimen of a bee on yellow composite flowers, which he subsequently determined as *Hylaeus annularis* (Kirby) which has the scapes of its antennae very large. This is a stem nesting species. Richard Dickson's large list for the day indicated that he also took two individuals of this species.

In the afternoon beside the Oxtall Meadow Ponds, broad-bodied chaser, emperor, blue-tail and narrow-bordered dragonflies as well as large red and azure damselflies were all determined to be present by members of the field party. Five-spot burnet and cinnabar moths as well as a specimen of the bee, *Anthophora bimaculata* (Panzer), found on lavender, were all present adjacent to the old farm buildings of Grange Farm.

In the Alver Valley meadows, whitethroat, blackcap, chiff-chaff and skylark were seen as well as two small heath butterflies, a brimstone and a comma butterfly plus a light emerald moth *Campaea margaritata* (L.). In the Alver reed-beds Richard Dickson identified *Alabonia geoffrella* (L.), a micro moth of woodland probably sheltering here as well a specimen of *Depressaria daucella* (D. & S.) that usually develops in *Oenanthe* plants. Other more local insects recorded for the Alver Valley and Wild Grounds by Richard Dickson included the stem-nesting eumenid wasp, *Gymnomerus laevipes* (Shuckard), the local pentatomid shieldbug, *Neottiglossa pusilla* (Gmelin), and chamomile shark moth, *Cucullia chamomillae* (D. & S.). In the meadows at Junkett Bottom, 8 small heaths, and a meadow brown butterfly were recorded. The notable (Na) status eumenid wasp, *Odynerus melanocephalus* (Gmelin in Linnaeus) was frequent on mayweed flowers. The RDB3 cuckoo wasp *Hedychridium coriaceum* (Dahlbom) was another Richard Dickson record of a scarce species for the site.

Further north-west in the Hillbury meadows amongst the planted field scabious and sainfoin flowers, more small heaths as well as marbled white butterflies were seen by David Tinling. The pyralid moth *Crambus perlella* (Scopoli) was also found here, usually an inhabitant of boggy areas but more widespread in other habitats in this area apparently. The hoverflies, *Eristalis arbustorum* (L.), *Xanthogramma pedissequum* (Harris), *Chrysotoxum bicinctum* (L.) and *Chrysotoxum festivum* (L.) were frequent. European chinch bugs, *Ischnodemus sabuleti* (Fallén) were found on grass stems by Stuart Ball. Several large nymphs of *Metrioptera roeselii* (Hagenbach) (Roesel's Bush Cricket) were swept by Richard Dickson in the grassland of this area, the reclaimed landfill part of the site. Plants of hoary cress, *Lepidium draba*, a well-established, locally common occupant of the area were found alongside introduced corncockle.

The large variety of insects recorded on the day including several quite local species shows that this area is still an important one for biodiversity despite all the changes that it has experienced over recent years. Species lists for the day have been sent to the Hampshire Biodiversity Information Centre (HBIC).

Thanks go to Fred Gibson and Pat Pattinson and the other staff of Gosport Borough Council for giving permission for the meeting to go ahead in the Alver Valley and for their participation and welcome to all attendees on the day. Thanks also go to Malcolm Bartlett, representing the Defence Infrastructure Organisation for permission to hold part of this meeting on Browndown (North).

Wytham Woods, Berkshire, 16 October 2011

Leader: **Ian Sims**. – This was a joint field meeting between the British Entomological and Natural History Society and the Berkshire Moth Group. The objective was to record leaf-mining micro-lepidoptera, in an attempt to discover the scarce oak-feeding species *Phyllonorycter roboris* (Zeller) and *P. messaniella* (Zeller), and *P. nigrescentella* (Logan) mining bush-vetch. These, and other unusual records for Berkshire, are recorded by Brian Baker for this area in his book *The Butterflies and Moths of Berkshire*. The locality is a mixture of ancient woodland and grassland of around 500 hectares in area, located on a chalk outlier of the Chiltern Hills (O.S. Map Ref. SP 4608).

On a bright sunny day, after a cool misty dawn, the meeting commenced at around 11.00h. The party of seven, including the leader, left the car park at the edge of Wytham Woods along the main central ride into the forest. Later, we were joined by Martin Harvey, the County Lepidoptera Recorder, and his son.

Larvae of micro-lepidoptera were identified mining the foliage of beech, sycamore, oak, hazel, field maple, sloe, bramble and honeysuckle, and some were collected for subsequent rearing. Martin's son beat several interesting species of shield bug (Hemiptera – Heteroptera) from trees and shrubs.

Lunch was taken in the woods, followed by a demonstration of leaf-litter sieving for case-bearing micro-lepidopterous larvae. During a very brief demonstration session at least five larval cases of a long-horn moth were noted and retained for rearing. These later proved to be *Adela reaumurella* (L.). The party then proceeded to explore open areas of chalk grassland at the top of the hill. Here several species of leaf-miner not seen up to this point were found in turkey oak, dog rose and St. John's wort.

Re-tracing our route on the way back to the car park several bracket fungi infested with tineid and coleopterous larvae were sampled for subsequent rearing. One possible mine of *P. nigrescentella* was located in bush-vetch growing beside the path, and retained for rearing.

A total of 78 species of Lepidoptera (mostly leaf mining microlepidoptera) was identified on the day, or have been confirmed by subsequent rearing. Five species of Hemiptera were recorded by the Harvey contingent and 13 species of other orders (mostly Coleoptera) were also recorded. Some of the more notable Lepidoptera species were: *Acleris cristana* (D.&S.), beaten as an adult (M. Harvey); *Phyllonorycter lautella* (Zeller), reared from mines in oak foliage; *Caloptilia rufipennella* (Hübner), identified from vacated feeding cones on maple; *Nemapogon clematella* (Fabr.), identified from larval feeding on fungus (*Diatrype disciformis*) growing on dead hazel, and *Luffia ferchaultella* (Stephens) cased larvae feeding on algae on tree trunks.

Unfortunately, none of the three target species mentioned above were seen or reared. However, as the party covered only a small part of this large and important locality we plan a follow-up meeting next autumn in order to work other areas of this woodland complex.

THE SOCIETY'S PUBLIC LIABILITY INSURANCE

In 1997 the Society extended its third party liability insurance for cover in respect of official Society events to include field work carried out by members as part of their personal activities. It was expected that this would cover the insurance obligations, which accompany applications for collecting and recording permits in many cases.

The Society has received a number of queries regarding the scope of the cover provided and this notice will hopefully clarify the position.

At events arranged by the Society and its sister organisations, Dipterists' Forum, BMIG, and BWARS, public liability insurance is in place which covers injury and damage to third parties arising from the activities of members and guests. Events include both field meetings and indoor events such as workshops and exhibitions. The cover provided is £5,000,000. It is important that permits for field meetings are issued in the name of the Society, or sister organisation, or to an individual on behalf of the Society, not in the name of the leader of the meeting.

The Society's insurance policy also provides £5,000,000 of public liability insurance to individual members of the Society and sister organisations, in respect of their own field work and entomological research which is not part of a Society activity, providing this is undertaken in the United Kingdom and is not carried out with a view to financial reward.

Members who are contemplating carrying out field work on a paid basis are specifically excluded from this cover. We have now procured an arrangement by which such members can approach our brokers directly to obtain individual third party liability cover under our policy. This will incur the payment of an additional premium by the member concerned. We understand this will result in a very marked saving compared with obtaining this cover through a fresh policy.

We must emphasise that the cover referred to above is Public Liability Insurance and does not include Professional Indemnity, for which separate arrangements have to be made.

The Society's insurance policy number is,

Royal Insurance H2/RKE274258-7.

Our brokers are,

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Editor: J. S. Badmin, H.F.R.E.S., Coppice Place, Perry Wood, Selling, nr Faversham, Kent ME13 9RP (Tel: 01227 752291) email: jbadmin@btinternet.com

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BRITISH ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY

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The Society arranges a programme of talks on Saturdays at various locations in Great Britain and a joint evening lecture with the LNHS in London in September. In addition, workshop meetings are held at the Society's headquarters and the well-known ANNUAL EXHIBITION takes place in the autumn. The 2013 Exhibition will take place in November at Kempton Park Racecourse, Sunbury-on-Thames, TW16 5AQ. Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings. The current Programme Card can be obtained on application to the Society at its headquarters at Dinton Pastures or in downloadable form from the website www.benhs.org.uk.

The Society maintains a library and invertebrate collections at its headquarters in Dinton Pastures, which are open to members on various advertised days each month. The Society's web site, <http://www.benhs.org.uk>, has the latest news.

Applications for membership to the Membership Secretary: D. Young, 22 Wordsworth Close, Saxmundham, Suffolk IP17 1WF. Tel: 01728 603568.

Subscriptions and changes of address to the Assistant Treasurer: R. D. Hawkins, 30D Meadowcroft Close, Horley, Surrey RH6 9EL.

Non-arrival of the Journal, faulty copies or other problems arising from distribution of the Journal or notices to Rosemary Hill, enquiries@benhs.org.uk or Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH.

Orders for books and back numbers of the Journal and Proceedings to the Sales Secretary: M. Darby, Malthouse Books, The Old Malthouse, Sutton Mandeville, Salisbury, Wiltshire SP3 5LZ. admin@malthousebooks.co.uk.

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All other enquiries: enquiries@benhs.org or in writing to Dinton Pastures Country Park, Davis Street, Hurst, Reading, Berkshire RG10 0TH.

Society Website: www.benhs.org.uk for recent information on the Society's meetings programme and general society details. The Society also has a Facebook page.

Cover photograph: *Conops quadrifasciatus*, Cors Fochno (Borth Bog), Ceredigion, 15.viii.2010. Photo: Kevin McGee.

NOTE: The Editor invites submission of photographs for reproduction on the front covers of the journal. The subject matter is open, with an emphasis on aesthetic value rather than scientific novelty. Submissions should be in the form of colour or black and white digital images (jpg or tiff format) with a minimum resolution of 1275 pixels (i.e. 4.25 inches @ 300dpi).

***TETRIX SUBULATA* (ORTHOPTERA: TETRIGIDAE) NEW TO VC 59 (SOUTH LANCASHIRE)**

PHILIP H. SMITH

9 Hayward Court, Watchyard Lane, Formby, Liverpool L37 3QP
philsmith1941@tiscali.co.uk

ABSTRACT

Tetrix subulata (L.) was recorded for the first time in the Sefton Coast sand-dune system, north Merseyside, during 2011/12. Small populations were found on the fringes of dune-slacks and ponds in ten tetrads. Ten different colour morphs are described. A series of inland records from 2009 onwards is also presented, these apparently representing the first observations of this largely southern species in VC 59 (South Lancashire).

INTRODUCTION AND METHODS

On 24 April 2011, while recording flora on the fringe of a wet dune-slack in the Birkdale frontal dunes on the Sefton Coast, Merseyside (VC 59, South Lancashire), I disturbed a small insect at National Grid Reference SD302137. This was taken to be *Tetrix undulata* (Sowerby) (Common Ground-hopper), a species I had seen several times previously in the dunes. Another was spotted a few metres away and photographs were taken using a macro-lens on a digital SLR camera. Upon viewing them later, it was realised that, amongst other features, the insect had a long pronotum and a low keel and was therefore not *T. undulata* but *T. subulata* (L.) (Slender Ground-hopper). The regional Orthoptera recorder, Dr Jennifer Newton (*in litt.*, 2011), confirmed the provisional identification from photographs, stating that she knew of no other authentic records for the vice-county. However, it subsequently became known that staff of World Museum Liverpool had also recorded *T. subulata* during inland surveys in South Lancashire in 2009/11. Further inquiries revealed several other recent records for this species in VC 59, these together with those from the Museum being summarised in Table 1 and Fig. 1.

The Birkdale find prompted further careful searches in similar habitat during 2011 and 2012 throughout the dune system by walking slowly, looking for movement in the vegetation. Sweep netting or trapping was not attempted. Many of the individuals found were photographed, the habitat was described in general terms and a hand-held Garmin Etrex GPS device was used to obtain accurate Grid References ($\pm 5\text{m}$). Data were provided to the regional and national Orthoptera recording schemes and to Merseyside BioBank.

RESULTS

Tetrix subulata was recorded at sixteen Sefton duneland sites within ten tetrads (four hectads) between Queen's Jubilee Nature Trail, Southport, in the north and Hightown sand-dunes in the south, a linear distance of about 16km (Table 2; Fig. 2). Sightings were made between 24 April and 4 May and from 28 August to 9 September in 2011; then between 21 April and 25 May 2012. None were seen during the early summer period. The insects proved extremely difficult to find, the maximum number seen at any one site being only ten individuals. Short flights of up to 4m were noted on only two occasions. In a few cases, disturbed individuals hopped into adjacent open water and swam actively by kicking with the back-legs to the shore or nearby vegetation, as described by Benton (2012) and Marshall & Haes (1990).

Table 1. South Lancashire records of *T. subulata* in date order, excluding the Sefton Coast.

Date	Locality	Grid Ref.	Recorder	Notes
20.iv.2009	Garston/Speke	SJ4182	C. Felton	Coarse grassland of <i>Arrhenatherum elatius</i> & <i>Dactylis glomerata</i> ; near winter flooding
16.ix.2009	Astley Moss	SJ69729737	C. Felton	Track
07.iv.2010	Astley Moss	SJ69749743	C. Felton	Pitfall trap; restored fen
10.v.2010	Astley Moss	SJ69749743	C. Felton	Water trap; restored fen
18.v.2010	Astley Moss	SJ69749743	C. Felton	Water trap; restored fen
18.v.2010	Astley Moss	SJ69729737	G. T. Knight	
25.vi.10	Astley Moss	SJ69749743	C. Felton	Water trap; restored fen
19.vii.2010	Astley Moss	SJ69549758	C. Felton	Malaise trap; recovering bog
06.viii.2010	Astley Moss	SJ69689728	C. Felton	Malaise trap; wet woodland
03.ix.2010	Astley Moss	SJ69729737	I. D. Wallace	Carrot field with pool
02.iv.2011	Great Sankey	SJ57628866	J. Clarke	
10.iv.2011	Knowsley Village fields	SJ427955	C. Felton	Coarse grassland of <i>Arrhenatherum elatius</i> & <i>Dactylis glomerata</i> ; near winter flooding
04.ix.2011	Edgerton Allotment, Bolton	SD70471499	B. Deed	
30.ix.2011	Sandy Brow, Kirkby	SJ445981	C. Felton	Coarse grassland of <i>Arrhenatherum elatius</i> & <i>Dactylis glomerata</i> ; near winter flooding
24.iii.2012	Edgerton Allotment, Bolton	SD70461500	B. Deed	Using bare soil on planting beds
24.iii.2012	Edgerton Allotment, Bolton	SD70481499	B. Deed	On gravel next to allotment
02.iv.2011	Great Sankey	SJ57628866	J. Clarke	Field record
30.iv.2012	Mossley Hill, Liverpool	SJ3986	P. F. Whitehead	Suburban lawn on moss <i>Rhytidiadelphus squarrosus</i>
07.v.2012	Edgerton Allotment, Bolton	SD70471499	B. Deed	
27.v.2012	Edgerton Allotment, Bolton	SD70471499	B. Deed	

A great range of colour variation was apparent, Table 3 providing brief descriptions of ten different colour forms observed. Ground-colour of individuals ranged black to pale buff, many having pale patches on the pronotum and/or hind femora (Plate 13, Figs 1–4). Most of these forms are also illustrated by Benton (2012). Colour polymorphism in *T. subulata* is well established; Hochkirch, Deppermann & Gröning (2008a) provided evidence that it is determined partly by genetics and partly by the colour of substrate upon which the young are reared. However, Karlsson *et al.*'s (2009) study found no significant effects on colour or patterning of adults reared on different coloured substrates. Evidently, further research is required.



Fig. 1. Distribution of *Tetrix subulata* in v.c. 59 (South Lancashire) up to July 2012

On 16 May 2012, M. Foley (*in litt.*, 2012) photographed what he thought was *T. undulata* at Pinfold Pond, Ainsdale. However, J. Newton pointed out that this appeared to be the short-winged form *bifasciata* of *T. subulata*. As it superficially resembles *T. undulata*, this form is easy to overlook. Unfortunately, later visits to the pond failed to re-discover f. *bifasciata*.

On the Sefton Coast, the main habitat of *T. subulata* was short mossy rabbit-grazed vegetation on the fringes of calcareous dune-slacks and ponds, usually where there had been some recent lowering of the water-level. Often there was some exposure of damp bare mud or sand. On a few occasions, specimens were also found in taller vegetation but always near water.

Tetrix undulata was also recorded at most of the Sefton Coast sites supporting *T. subulata*, numbers and density being similarly low. Sometimes, the former species occupied slightly drier habitat further from the water's edge than *T. subulata* but this distinction was not always apparent. This co-existence was unexpected, as Hochkirch, Bruckner & Gröning (2008b) found that, although *T. undulata* and *T. subulata* are sympatric in large parts of western and central Europe, they rarely share the same habitat. However, Benton (2012) contradicted this opinion, stating that the two species commonly occur in mixed communities in south-east England.

Table 2. Records of *T. subulata* on the Sefton Coast, Merseyside in 2011/12 (all PHS)

Date	Number	Locality	Grid Reference	Tetrad	Notes
24.iv.2011	2 ad.	Birkdale Sandhills LNR	SD3019713651	SD31B	Mossy Rabbit-grazed slack edge
28.iv.2011	1 ad.	Birkdale Sandhills LNR	SD3015813550	SD31B	Mossy Rabbit-grazed slack edge
30.iv.2011	1 ad.	Range Lane, Formby	SD2845505590	SD20X	Edge of pond, Rabbit-grazed
30.iv.2011	2 ad.	Cabin Hill NNR	SD2845105170	SD20X	Short, open slack vegetation with mosses
30.iv.2011	2 ad.	Cabin Hill NNR	SD2841105124	SD20X	Short, open slack vegetation with mosses
01.v.2011	1 ad.	Queen’s Jubilee Nature Trail, Southport	SD3227416320	SD31I	Slack edge, <i>Salix repens</i> with mosses
01.v.2011	3 ad.	Queen’s Jubilee Nature Trail, Southport	SD3228516795	SD31I	Edge of wetland with mosses
01.v.2011	4 ad.	Birkdale Sandhills LNR	SD3140615595	SD31C	On moss in wettest part of slack 28
01.v.2011	1 ad.	Birkdale Sandhills LNR	SD3135615478	SD31C	Wet mossy edge of slack 27
02.v.2011	5 ad.	Hightown dunes	SD2972502171	SD20W	Wet mossy Rabbit-grazed edge of scrape
04.v.2011	1 ad.	Ainsdale Sandhills LNR	SD2952412159	SD21W	Mossy open wet-slack vegetation
04.v.2011	1 ad.	Ainsdale Sandhills LNR	SD2919011698	SD21V	Edge of Rabbit-grazed scrape in thick moss
29.viii.2011	3 ad.	Freshfield Dune Heath NR	SD2996009202	SD30E	Edge of dried up pond in <i>Agrostis stolonifera</i>
09.ix.2011	1 ad.	Tagg’s Island, Birkdale	SD3121715805	SD31C	Edge of seasonal wetland
09.ix.2011	3 ad.	Tagg’s Island, Birkdale	SD3111615896	SD31C	Rabbit-grazed wet-slack vegetation
21.iv.2012	10 ad.	Ainsdale Sand Dunes NNR	SD3028611265	SD31A	Mossy fringe of Pinfold Pond
06.v.2012	1 ad.	Freshfield Dune Heath NR	SD2931109034	SD20Z	Mossy edge of 3-year-old pond

LNR = Local Nature Reserve; NNR = National Nature Reserve

DISCUSSION

The dune-slack habitat of *T. subulata* on the Sefton Coast accords with that described, for example, in Benton (2012), Evans & Edmondson (2007) and Marshall & Haes (1990). However, some records elsewhere in VC 59 are from less characteristic habitat, such as coarse grassland, a suburban lawn, allotments and recovering bog (Table 1). The series of records from Astley Moss, Greater Manchester, is particularly interesting, as this site has generally acidic substrates rather than the base-rich conditions more usually associated with this insect (Marshall & Haes, 1990: Evans & Edmondson, 2007). However, *T. subulata* may have wider preferences than previously thought. Thus, B. Deed (*in litt.*, 2012) recorded it on allotment soil and gravel near Bolton, Greater Manchester (Table 1),

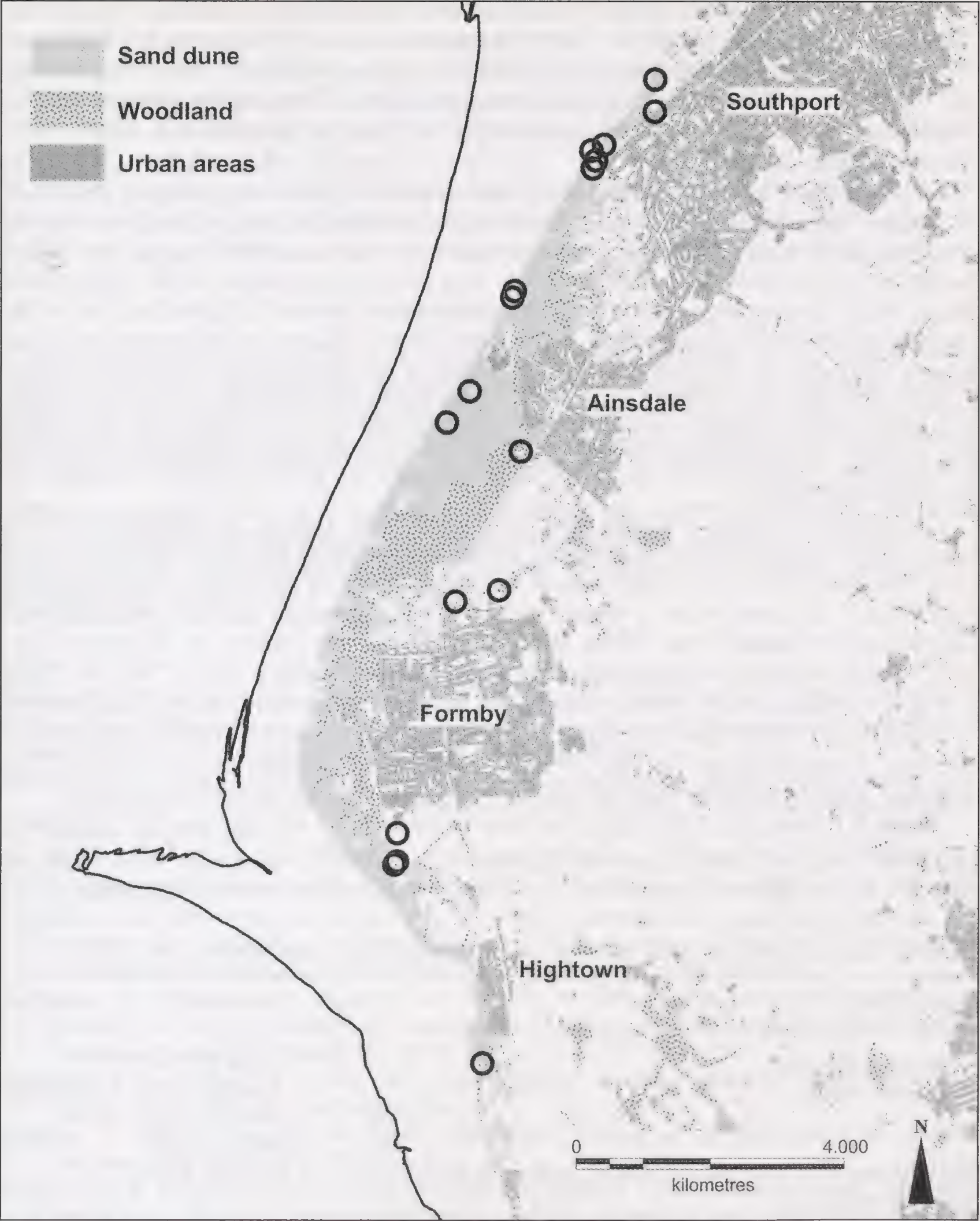


Fig. 2. Distribution of *Tetrix subulata* on the Sefton Coast, Merseyside, up to July 2012

while Whitehead (2009) found this species in the compost of containerised plants in Worcestershire and also in a bed of cultivated heather (*Erica carnea* L.) in a rural Warwickshire garden. Benton (2012) also mentioned that *T. subulata* can be found well away from open water in damp woodland rides or on cart tracks. However, he stressed that areas of sunny bare ground are essential and also stated that this species appears to be an effective colonizer of newly created habitats.

Records elsewhere in South Lancashire were somewhat earlier and later in the year than on the coast, the earliest in spring being on 24 March 2012 and the latest in

autumn on 30 September 2011. Also, there were two summer sightings, on 25 June 2010 and 19 July 2010 (Table 1). These timings accord with the known life history of *T. subulata*. Late instar nymphs and immature adults overwinter, becoming mature the following spring and laying eggs from late April. These adults survive only to about July, the next generation appearing from August (Marshall & Haes, 1990: Benton, 2012).

Tetrix subulata has a largely southern and eastern distribution in Britain (Marshall & Haes, 1990; Benton, 2012). Until recently, distribution maps produced by the *National Biodiversity Network's Gateway* gave the nearest localities to the Sefton Coast as North Wales and the Silverdale area, north Lancashire, both being about 60km away. Interestingly, almost all the specimens collected at Silverdale are of the short-winged form *bifasciata* Herbst (Newton, 1999), while most of the Sefton Coast insects represent the normal long-winged form. In her paper on Orthoptera in North Lancashire, Newton (1999) stated: '*T. subulata* could well be present in South Lancashire and is worth looking out for, on open wet, base-rich substrates with algae and mosses.' The discovery of *T. subulata* in VC 59 from 2009 onwards accords with Newton's prophesy.

The Sefton Coast sand-dunes have been intensively studied by entomologists for many years, World Museum Liverpool having an inventory of over 3300 invertebrate taxa recorded here (Smith, 2009). As it is unlikely that this insect has been previously overlooked, it seems to be a recent arrival. *Tetrix subulata* has also become well-established in Cheshire and Wirral (VC 58) in the last few years (I.R. Wallace *in litt.*, 2012) and is evidently widespread in the southern and western part of VC 59 (Table 1; Fig. 2). Evidence for a further expansion northwards comes from the discovery of *T. subulata* on moist bare ground at Brockholes Nature Reserve (SD588306) east of Preston, Lancashire, on 26 and 27 May 2012 by A. Holmes and M. Foley. This wetland, adjacent to the river Ribble, is just within VC 60 (West Lancashire).

Heads & Chesmore (2008) described new records of *T. subulata*, mainly since 2001, in Yorkshire (VC 61 and 64), including localities with acid soils, as at Astley Moss. In contrast to the Sefton Coast, only two colour morphs were noted. They suggest that

Table 3. Colour forms of *Tetrix subulata* on the Sefton Coast sand-dunes in 2011/12

Colour form	Locality
Uniformly pale buff	Cabin Hill NNR
Uniformly black	Ainsdale NNR; Cabin Hill NNR; Queen's Jubilee Nature Trail
Dark brown with pale grey on dorsal surface of head and pronotal shield	Birkdale LNR
Mid-brown, speckled with dark brown/black spots	Freshfield Dune Heath NR
Dark brown with pale patches on pronotal shield and femora	Birkdale LNR
Reddish-brown with pale patches on pronotal shield and femora	Freshfield Dune Heath NR
Reddish-brown with yellow on dorsal surface of head, pronotal shield and femora	Freshfield Dune Heath NR
Dark reddish-brown with white spots on femora	Range Lane, Formby
Dark reddish-brown with whitish patches near front of pronotal shield and on femora. Whitish lines bordering head, anterior part of pronotal shield and dorsal surface of femora	Tagg's island, Birkdale
Black with pale straw and black spots on dorsal surface of head, pronotum and femora	Ainsdale NNR

this rapid northwards expansion is due to climate change, assisted by the fact that this species is a strong flyer and swims well. However, they also point out that *T. subulata* is easy to overlook and may therefore be more widespread than previously thought, especially in habitats previously considered unsuitable.

A similar distributional change for another southern orthopteran, *Conocephalus dorsalis* (Latreille) (Short-winged Conehead), has been reported since 2002 in northwest England, this being also linked to climate change (Smith & Newton, 2007; Newton & Smith, 2008). *Tetrix subulata* should be found increasingly widely in South Lancashire and seems likely to move progressively northwards in future years.

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SHORT COMMUNICATION

Amongst the butterfly collectors, June 2012. – In June this year I travelled with some friends to the area of Bois-de-Merles in North Eastern France. This is a famous area for moths, and also, I discovered, for butterflies. The woods are mixed and extensive with much aspen, *Populus tremula* in particular. For the duration of our stay in the area, during which we visited the woods several times at night and in the day, the weather was wet and abnormally cold for the time of year. Although the woods are rich entomologically they are poorly served with rides, many of which have now become overgrown, and effectively the main ride is the road through the centre of the wood which is little used by traffic. We rarely encountered more than one car an hour while we were there.

On our first visit we encountered a number of butterfly collectors, all keen to capture *Limenitis populi* (L.) a butterfly for which it transpired this wood is well known. *Limenitis populi* is a large and beautiful species of Nymphalidae, whose distribution extends across the whole of the temperate Palaearctic to Japan (Tshikolovets, 2011) and can be extremely common in the right circumstances, judging by the images available on the internet. The principal host plant is aspen and it inhabits deciduous and mixed forests to a mid-altitude range of 1600m. The female can be as large as 83 mm in wing span, so it is an impressive beast. Rather like *Apatura iris* (L.), the Purple Emperor, the insect tends to stay in the canopy unless it can be tempted lower to visit all manner of unsavoury titbits.

The collectors were from Belgium and Luxembourg as well as France, and were all extremely friendly and keen to offer advice on catching *populi*, which they assumed was also of interest to us. Why else would we be there? The butterfly was certainly of paramount interest to them, and they all had their own techniques.

One chap rode constantly round and round the wood on a bicycle, net in hand, waiting for a butterfly to venture low enough to strike. Some poured piles of ash into the rides or onto the road to attract their quarry; this bizarrely actually works as we saw one taken at ash. Some swore by rotten bananas, some by strong cheese, a dead mole had its advocates; others guarded piles of dung. One man confided in me that none of these techniques were worth a light: "Non, non, none of this is any good, only pisse will make them come". By this I understood that he was recommending the deployment of a urine lure!

The chap on the bicycle explained that a few years earlier the butterfly was so abundant that he had counted 365 dead in the mile of road through the wood. "One for each day of the year." Could this be true, I wonder? He said the butterfly remained common, in spite of the rides being neglected, but with weather conditions how they were, he was lucky to get two. Still, he will be back next year.

In sixty years of interest in Lepidoptera I had not encountered anything quite like this; it made me think of Heslop after *A. iris* or lycaenid specialists striding the Folkestone downs, line abreast (Heslop, Hyde & Stockley, 1964). A bygone time.

No doubt there was an element of commercialism in all this at which I should be appalled. However, such a widespread butterfly cannot actually be at risk from such activities, certainly not from the few that were taken, and I must admit to finding the whole experience hilarious. Who would have thought such things went on in this sanitised day and age.

TONY PICKLES

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FIRST INCURSIONS IN EUROPE OF FOUR AUSTRALASIAN SPECIES OF ARMoured SCALE INSECT (HEMIPTERA: DIASPIDIDAE)

C. MALUMPHY¹ & A. J. HALSTEAD²

¹*The Food and Environment Research Agency, Sand Hutton, York YO41 1LZ*

²*Entomology, Royal Horticultural Society's Garden, Wisley, Nr Woking, Surrey, GU23 6QB*

ABSTRACT

The first incursions in Britain (and Europe) of four species of Australasian armoured scale insect (Hemiptera: Diaspididae) are reported. *Chionaspis xanthorrhoeae* Fuller was found breeding indoors on two 100+ year old *Xanthorrhoea* sp. plants at private premises in Biddenham, Bedfordshire, England, in 2009. The plants had been bought from a commercial plant nursery in Wales in 2003, and the scales had been breeding in Britain for at least six years. *Fusilaspis phymatodidis* (Maskell) was found causing chlorosis and brown necrotic spotting to the foliage of *Dicksonia antarctica* and *Woodwardia radicans*, and to a lesser degree *Blechnum* sp. and *Dryopteris* sp., grown in polytunnels at Rosemoor, the Royal Horticultural Society's Garden near Great Torrington, North Devon, England, in 1994, and outdoors in 1995. *Parlatoria pittospori* Maskell was found causing chlorosis to the foliage of a mature *Aloe glauca* grown indoors at the Royal Botanic Gardens, Kew, Surrey, England, in 1995. *Pseudaulacaspis brimblecombei* Williams was found breeding indoors on two *Telopea* 'Golden Globe' plants at a commercial premises in Cambridge, Cambridgeshire, England, in September 2012. The infested plants had been imported from Italy six months earlier, although *P. brimblecombei* is not known to occur in Italy. The biology, host plants and geographical range for each of these scale insects are reviewed and their potential economic and environmental impact in Britain discussed.

INTRODUCTION

Scale insects (Coccoidea) are commonly transported in plant trade and many species have become widely distributed due to anthropogenic activities. The reasons why scale insects are so commonly transported in trade have been discussed by Malumphy (1996). Each year scale insect species are detected on imported plant material for the first time in Britain, and it is not surprising therefore, that despite quarantine measures, new species of scale insect are introduced. The majority of the scale insects intercepted on imported plant material come from countries with warmer climates than found in Britain and are likely to be restricted to indoor plantings here. All of the scale insect species that are regularly found in glasshouses in Britain are non-native introductions (Malumphy, 2009, 2010; Malumphy & Badmin, 2012). The purpose of this paper is to report the first known incursions of four Australasian diaspidid species in Britain. These also appear to be the first records of these species in Europe (Pellizzari & Germain, 2010).

Slide-mounted specimens of all four species have been deposited at The Food and Environment Research Agency (FERA) and the Natural History Museum, London, UK.

AUSTRALASIAN DIASPIDIDAE RECORDED IN BRITAIN

Chionaspis xanthorrhoeae Fuller

Two mature (100+ year old) blackboy plants or grass-trees (*Xanthorrhoea* sp., Xanthorrhoeaceae) were bought from a commercial plant nursery in Wales in 2003

and grown indoors in Biddenham, Bedfordshire. An infestation of scale insects developed on the plants, one being much more heavily infested than the other. A sample was submitted in May 2009 to the Royal Horticultural Society's Garden, Wisley (RHS), Surrey, and then forwarded to The Food and Environment Research Agency (FERA), laboratory at Sand Hutton, where it was identified as *Chionaspis xanthorrhoeae* Fuller (Plate 14, Figs 1–2). The sample contained all developmental stages of the insect, with the exception of adult males; first-instar nymphs were actively crawling about. *Chionaspis xanthorrhoeae* is native to Australia (Western Australia), and feeds exclusively on *Xanthorrhoea* species (Fuller, 1897; Ben-Dov, Miller & Gibson, 2012). Its biology is unknown but all developmental stages were observed in Britain during May, and it may therefore have overlapping generations and breed continuously if conditions allow. No natural enemies have been recorded. It is not recorded as an economic pest, although it feeds on plant sap, which may weaken the host. *Chionaspis xanthorrhoeae* is only recorded in Britain from a single location on two plants, but is likely to persist for the foreseeable future as the plants can live for centuries and the scales are difficult to control.

***Fusilaspis phymatodidis* (Maskell) – New Zealand fern scale
= *Pseudaulacaspis dubia* (Maskell)**

Heavy infestations of a scale insect were found causing considerable chlorotic and brown spotting on the foliage of the ferns *Dicksonia antarctica* Labill. (Dicksoniaceae) and *Woodwardia radicans* (L.) Sm. (Blechnaceae), and to a lesser extent *Blechnum* sp. (Blechnaceae) and *Dryopteris* sp. (Dryopteridaceae), growing in a polytunnel in the Royal Horticultural Society's Garden (Rosemoor) near Great Torrington, North Devon, on 30 September 1994, by the second author. A sample was submitted to the then Central Science Laboratory (CSL) (now part of FERA) where it was identified as *Fusilaspis phymatodidis* (Plate 14, Figs 3–4) and its identity was subsequently confirmed by Doug Williams at the Natural History Museum. The scales were first noticed on the tree fern, *D. antarctica*, which had been obtained from a nursery in Par, Cornwall, and did not have any direct import connection. The scales persisted for at least a year and samples were collected again from *D. antarctica* and *W. radicans*, planted outdoors, by the second author on 16 October 1995. Its current status is uncertain.

Fusilaspis phymatodidis is only known from New Zealand (Ben-Dov, Miller & Gibson, 2012). It is polyphagous on ferns, but has also been found occasionally on non-fern hosts such as *Coprosma* and *Rubus*. It is recorded feeding on the following plant families and genera: Aspleniaceae, *Asplenium*; Blechnaceae, *Blechnum*, *Doodia*; Cyatheaceae, *Cyathea*; Dicksoniaceae, *Dicksonia*; Dryopteridaceae, *Lastreopsis*, *Polystichum*; Ericaceae, *Cyathodes*; Gleicheniaceae, *Gleichenia*, *Sticherus*; Hymenophyllaceae, *Hymenophyllum*, *Trichomanes*; Lygodiaceae, *Lygodium*; Marattiaceae, *Marattia*; Myrtaceae, *Leptospermum*; Polypodiaceae, *Grammitis*, *Microsporium*, *Phymatodes*; Pteridaceae, *Adiantum*, *Pellaea*; Rosaceae, *Rubus*; Rubiaceae, *Coprosma*; Tectariaceae, *Arthropteris* (Henderson, 2011; Ben-Dov, Miller & Gibson, 2012).

It is not recorded as an economic pest, although it was causing chlorosis and necrotic spotting to the *Dicksonia* tree ferns in Devon.

***Parlatoria pittospori* Maskell – pittosporum or mauve pittosporum scale**

The foliage of a single mature *Aloe glauca* Miller (Asphodelaceae) grown in a glasshouse at the Royal Botanic Gardens, Kew, Surrey, was found to be heavily

infested with a scale insect, on 7 December 1995 by Jim Keesing. A sample was submitted to the then CSL where it was identified as *P. pittospori*, and its identity again subsequently confirmed by Doug Williams. The infested plant had no recent import connection and the pathway of introduction is unknown.

Parlatoria pittospori is broadly polyphagous, feeding on host plants assigned to at least 27 families: Aizoaceae; Arecaceae; Asparagaceae; Asphodelaceae; Asteraceae; Buxaceae; Caprifoliaceae; Cornaceae; Cupressaceae; Cycadaceae; Elaeagnaceae; Ericaceae; Euphorbiaceae; Fabaceae; Loranaceae; Mimosaceae; Myrtaceae; Oleaceae; Pinaceae; Pittosporaceae; Proteaceae; Rosaceae; Rutaceae; Santalaceae; Taxaceae; Thymelaeaceae; Xanthorrhoeaceae (Henderson, 2011; Ben-Dov, Miller & Gibson, 2012). Some of the most important potential host plant genera in Britain include *Pinus* (pine), and the rosaceous genera *Malus* (apple), *Pyrus* (pear) and *Rosa* (rose). It appears to exhibit a preference for *Callitris*, *Pinus* and *Pittosporum*.

It is native to Australia and has been introduced to South Africa, New Zealand and the United States of America (California) (Henderson, 2000; Ben-Dov, Miller & Gibson, 2012). It has not been recorded causing economic damage to apple orchards (Hely *et al.*, 1982), but the feeding sites of the scale on cultivars of apples with green fruits turn red, giving the fruit an unsightly appearance (Richards, 1960), and the fruit may be rejected for export (Timlin, 1964; Webster, 1968). Scale numbers can build up rapidly on apple fruit, as a generation of *P. pittospori* can be completed in four months (Miller & Davidson, 2005). The most important host for *P. pittospori* in New Zealand is Monterey pine, *Pinus radiata* D. Don, which is grown to form shelter belts around orchards, and proved to be the source of scale infestations on apple (Timlin, 1964). Its current status in Britain is uncertain.

***Pseudaulacaspis brimblecombei* Williams – waratah or macadamia white scale**

The foliage and stems of two waratah *Telopea* ‘Golden Globe’ (Proteaceae) plants grown indoors at a commercial premises in Cambridge, Cambridgeshire, were found to be infested with a scale insect, on the 14 September 2012 by the Plant Health and Seeds Inspectorate. Two leaves were submitted to the FERA laboratory and found to harbour 50+ live adult females, thousands of live eggs and hundreds of active first-instar nymphs or crawlers, which were identified as *P. brimblecombei* (Plate 14, Figs 5–6). Each of the infested plants was approximately one metre tall and had been imported from Italy in March 2012, although *P. brimblecombei* is not known to occur in Italy. The plants had appeared to be pest free on arrival and the scale infestation had evidently developed over the summer. Control measures (non-statutory) are being taken against the scale.

Pseudaulacaspis brimblecombei is native to Australia (New South Wales and Queensland) (Froggatt, 1914; Williams, 1973), and has been introduced to New Zealand where it occurs mainly in the northern areas of North Island (Scott, 1984; Henderson, 2011). It is oligophagous on Proteaceae, and is occasionally found on plants assigned to other families. It is recorded feeding on the following plant families and genera: Agavaceae, *Cordyline*; Iridaceae, *Libertia*; Proteaceae, *Embothrium*, *Lomatia*, *Macadamia*, *Protea*, *Telopea*; Rutaceae, *Melicope* (Froggatt, 1914; Williams, 1973; Henderson, 2011). It has a single generation each year and overwinters in the egg stage (Scott, 1984).

In Australia it is a minor pest of macadamia nut production (Ironsides, 1980), and in New Zealand it is a pest of ornamental proteas such as *Telopea* (Scott, 1984). Large populations of the scale can look spectacular (Scott, 1984), smothering the foliage and stems in white scales.

DISCUSSION

The first incursions in Britain (and Europe) of four species of Australasian armoured scale insect are reported. The pathway of introduction into Britain is known only for one of the species, *Pseudaulacaspis brimblecombei*, which was found on growing plants imported from Italy. It took several years before the population of *Chionaspis xanthorrhoeae* reached a detectable level, and it is also probable that *Parlatoria pittospori* had been present for several years before it was detected.

Some of the most common scale insects in Britain on indoor plantings and outdoors are native to Australasia. For example, *Icerya purchasi* (Maskell), is an Australian species that was introduced to Britain in the 1990s, and has naturalised widely in Greater London (Watson & Malumphy, 2004). It also occurs more widely in Britain on indoor plantings. It is broadly polyphagous and occasionally a serious pest of ornamental plants, such as *Acacia*, *Choisya*, *Citrus* and *Pittosporum*, in Britain. The phormium mealybug, *Balanococcus diminutus* (Leonardi) is native to New Zealand, and has naturalized throughout most of Britain since the 1970s. It is host specific to *Phormium tenax* J.R.Forst. & G.Forst. and is a frequent, serious pest, occasionally killing plants (Bartlett, 1981; Malumphy & Badmin, 2012). Three other mealybug species, *Pseudococcus calceolariae* (Maskell), *Pseudococcus longispinus* (Targioni Tozzetti), and *Rhizoecus dianthi* Green, native to Australasia (Pellizzari & Germain, 2010), are glasshouse pests of ornamental plants. *Pseudococcus longispinus* is one of the most common and injurious glasshouse mealybugs in Britain. Two diaspidid species, *Leucaspis podocarpi* (Green) and *Symeria pyriformis* (Maskell), native to New Zealand, are naturalised in the Isles of Scilly (Williams, 1985). The potential economic or environmental impact in Britain of *C. xanthorrhoeae*, *F. phymatodidis* and *P. brimblecombei* is considered here to be negligible for the following reasons: *C. xanthorrhoeae* feeds exclusively on *Xanthorrhoea* and is likely to be restricted to indoor plantings; *F. phymatodidis* feeds almost exclusively on exotic ferns and is likely to be largely restricted to indoor plantings, although it could occur outdoors in sheltered situations in southern England; *P. brimblecombei* feeds mainly on exotic Proteaceae and is also likely to be largely restricted to indoor plantings, although it could occur outdoors in South West England (for example in the Isles of Scilly) where suitable hosts such as *Telopea* are grown. The potential economic and environmental impact of *P. pittospori* in Britain is less clear, as it feeds on many plants that are common outdoors in Britain, for example, apple, gorse, pine, pittosporum, rose and viburnum. If it became naturalised, it has the potential to have a detrimental effect on apple exports. However, it is not a significant economic pest in other parts of the world, and there is no obvious pathway from the botanic garden for it to be disseminated (infested plants will not be moved). The potential for *P. pittospori* to overwinter outdoors in Britain is uncertain.

ACKNOWLEDGEMENTS

The authors would like to thank Richard Chrystal for providing information on *Chionaspis xanthorrhoeae*; Doug Williams, of the Natural History Museum, London, for confirming the identity of *Parlatoria pittospori* and *Fusilaspis phymatodidis*; Jim Keesing, formerly of the Royal Botanic Gardens, Kew (who has sadly passed away), for taking a keen interest in scale insects and regularly submitting samples to CSL; Sue Lacey of the Plant Health & Safety Inspectorate for providing information on *Pseudaulacaspis brimblecombei*; and DEFRA for partially funding this work.

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SHORT COMMUNICATION

Ciidae (Coleoptera) on Lundy. – On 31 March 2012 I collected three larvae and a single elytron of the Australasian *Cis bilamellatus* Wood from a fruiting body of *Ganoderma* P. Karst. in Millcombe Valley on Lundy, SS138441. Close by, at SS139440, I found the native British ciid *Octotemnus glabriculus* (Gyllenhal) breeding in fruiting bodies of *Trametes versicolor* (L.) Pilát. I looked again at the *O. glabriculus* on the following day in company with Lundy warden Sophie Wheatley. One of the *C. bilamellatus* larvae subsequently developed into an adult female.

A comprehensive list of beetles recorded from Lundy has been compiled by Brendell (1976) and comprises an impressive 609 species. It includes no Ciidae and, since there appear to be no subsequent ciid records from the island, it would seem that the above details represent the first documented records of the family for Lundy. This is hardly surprising since the Ciidae are not a popular family with field entomologists. In addition, the limited availability on Lundy of the wood-rotting basidiomycete fungi on which these obligate fungivores depend (Hedger *et al.*, 2007; personal observation) means that ciids are not a prominent group on the island. Also unsurprising, given the presence of ciids on Lundy, is the occurrence there of *C. bilamellatus*. A demonstrably good disperser, this invasive species has become common on much of mainland Britain, and has also reached the Channel Islands, Isle of Man, Ireland and north-west France since its accidental introduction to south-east England during the nineteenth century (Paviour-Smith, 1960; Orledge, Smith & Reynolds, 2010). Despite the paucity of ciid host fruiting bodies on Lundy, *C. bilamellatus* may well be able to persist there since it breeds in a particularly wide range of ciid host fungi (Orledge & Reynolds, 2005). Hedger *et al.* (2007) report that one of *C. bilamellatus*' minor hosts, *Schizopora paradoxa* (Schrad.) Donk, is the commonest white-rotting basidiomycete on Lundy. The host range of the Palaearctic *O. glabriculus* is much narrower, being restricted primarily to species of *Trametes* and related genera (Orledge & Reynolds, 2005). However, this ciid's important host *T. versicolor* colonises a wide range of woody plants. Consequently, there is a reasonable likelihood of a sufficient continuity of this host on Lundy for *O. glabriculus* to persist there. – GLENDA M. ORLEDGE, Department of Biology and Biochemistry, University of Bath, Claverton Down, Bath. BA2 7AY.

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I thank Lundy warden Derren Fox for obtaining my collecting permit for Lundy and Sophie Wheatley for a copy of Brendell (1976).

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***PITHYOTETTIX ABIETINUS* (HEMIPTERA: CICADELLIDAE) – NEW TO BRITAIN, FROM SURREY**

JONTY DENTON

31 Thorn Lane, Four Marks, Hants, GU34 5BX

Email: JontyDenton@aol.com

ABSTRACT

The cicadellid leafhopper, *Pithyotettix abietinus* (Fallén) is reported as new to Britain from Surrey in south-east England. Several specimens were collected from Norway spruce *Picea abies* on 30 May 2011. In mainland Europe, this species was originally confined to coniferous and mixed woods at high altitudes but is nowadays found in many countries at lower altitudes wherever its hostplant occurs often in suburban settings. Its presence in the UK was therefore not entirely unexpected.

INTRODUCTION

On 30 May 2011, in heavy rain, three distinctive but unfamiliar hoppers (one of which was retained) were beaten from foliage of Norway spruce *Picea abies* (L.) Karsten, near Dunford Bridge, Surrey (TQ0161). A later visit on 13 May, yielded three more adults (two male and one female), all the adults found came from foliage of just two trees growing at the corner of an extensive plantation of *P. abies*. A poor quality photograph of the first specimen was sent to Dr Alan Stewart, who suggested that it may well be *P. abietinus* (Fallén), which it indeed proved to be.

DESCRIPTION

Adults are 5.3–6.0 mm in length, with red mottling on the head, pronotum and scutellum (extending onto the body of nymphs) (Plate 15, Figs 1–2). The wings are unlike any other hopper found in Britain. The aedeagus (Fig. 1) is also unmistakable, with the lop sided terminal appendages. The species is fully illustrated in Beidermann & Niedringhaus (2009).

ECOLOGY AND DISTRIBUTION

Pithyotettix abietinus is associated with *Picea abies*, and occurs across much of western Europe, and in areas where *P. abies* is not native such as Spain and much of France, and the low countries, where it is likely to have been introduced with its host plant. According to Nickel (2003) it is now widespread across Germany at low altitudes and found in suburban settings such as parks and cemeteries. There is evidence (Nickel, 2003) that it may also feed on European Silver-fir *Abies alba* Miller. Ossiannilsson, (1983) states that it hibernates as an egg, and is therefore likely to be nymphal in April–May, with adults maturing by mid to late May. The spring of 2011 was extremely warm, dry and sunny, so development in the UK may be later in typical years.

The hoppers were found in an abandoned tree nursery, on mature *P. abies* which had presumably originally been planted for cropping after 2–5 years as Christmas trees, but had become too large. *Picea abies* is not frequent as a mature tree in Surrey, and the plantation is somewhat isolated.

It is possible the hoppers prefer to feed high up on the trees as adults were taken on both occasions during and after heavy rain. An unsuccessful search was made on 4 June in hot dry weather (Scotty Dodd pers. comm.). Nickel (2003) confirms this

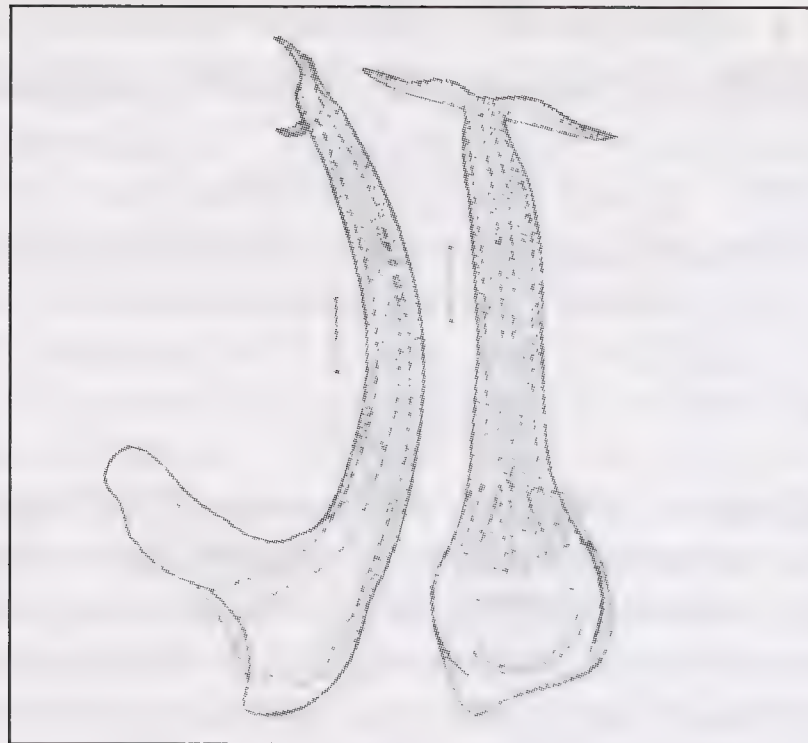


Fig. 1 *Pithytettix abietinus*, aedeagus from left and ventral aspect, after Ossiannilsson (1983). Scale bar = 0.1 mm.

impression and reports that the species is seldom recorded because adults usually stay in the upper canopy.

ACKNOWLEDGEMENTS

Thanks to Dr Alan Stewart for help with identification, and Scotty Dodd for organising the initial survey and helping search for more specimens.

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SHORT COMMUNICATION

A recent infestation of black scale *Saissetia oleae* (Olivier) (Hemiptera: Coccidae) in Kent. – The owner of the garden centre at Macknade, Faversham, Kent recently invited me (6.vii.2012) to inspect a well-established colony of scale insects on some small olive bushes kept in the shop foyer. This proved to be black scale *S. oleae*, and the sixth reported instance of this species in Kent (Malumphy & Badmin, 2012). The infestation had first been noted a year earlier. The adult female attaches itself to the host plant and remains immobile. It is brown when young becoming darker with age. The scale, 2.0–5.0 mm long, has a characteristic sub-ovate, convex shape, with prominent ‘H’ shaped dorsal ridges. Most of the scales were found on the stems but a few were also present on the foliage. Immature stages have been observed since. Site details have been logged with the Kent & Medway Biological Records Centre. – J. S BADMIN, Coppice Place, Selling, Kent ME13 9RP.

REFERENCE

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HOST PLANT PREFERENCE OF *CHARAGMUS GRESSORIUS* (COLEOPTERA: CURCULIONIDAE) A RECENTLY DISCOVERED WEEVIL IN BRITAIN

ANDREW J. CUNNINGHAM

9 The Close, Tiverton, Devon, EX16 6HR

Email: ajc321@hotmail.com

ABSTRACT

The occurrence of the southern European weevil *Charagmus gressorius* (F.) at Dawlish Warren, Devon is confirmed. Specimens were recorded from May to July 2012. A literature search showed that the weevil has a preference for introduced *Lupinus* spp. but also occurs on a wide range of other fabaceous genera. The possible route of entry of this species into Britain is discussed.

INTRODUCTION

The sitonine weevil *Charagmus gressorius* (F.) was recently reported as new to Britain (Cunningham, 2012). It was discovered at Dawlish Warren, Devon (VC 3) on the 28 May 2012. Dawlish Warren is a nature reserve managed jointly by Teignbridge District Council and Devon Wildlife Trust. The reserve is a Site of Special Scientific Interest (SSSI), a Special Area of Conservation (SAC) and a National Nature Reserve (NNR). The reserve is also within the Exe Estuary Special Protection Area. Due to the SSSI status, Natural England oversees much of the management of the reserve.

One of the aims of the original visit was to observe the introduced aphid *Macrosiphum albifrons* Essig on tree lupin *Lupinus arboreus*. The lupin is a short-lived North American semi-evergreen shrub which has naturalised itself extensively at the Warren after being planted in the late 1940s to stabilise the sand dunes (Ivimey-Cook, 1984). In addition to finding the aphid, several specimens of an unfamiliar curculionid were observed feeding on the lupins and photographed. Comparison with online images indicated the closest match to be *Charagmus gressorius*. Material sent to Max Barclay and Roger Booth of the NHM was conclusively identified as *C. gressorius*. This note discusses the host plant preferences of *C. gressorius* and its possible mode of entry into the UK.

SPECIES DESCRIPTION

Charagmus gressorius (Fig. 1; Plate 15, Fig. 3) has a distinctive appearance bearing some similarity to *Charagmus griseus* (F.). A key separating the two species is given by Cunningham (2012). Both share the tufts of upstanding scales on the scutellum that separates *Charagmus* from *Sitona*. The pronotum of *C. gressorius* has pale scales that form a prominent midline. The head is long and narrow with longish oval-shaped eyes. The total body length ranges from 7–10 mm. *Charagmus griseus* has a less defined pale mid line on the pronotum, a noticeably shorter and broader head with short oval eyes and ranges from 5.5–10 mm in body length.

ECOLOGY AND DISTRIBUTION

Three repeat visits to Dawlish Warren (8 and 16 June, 30 July 2012) resulted in finding the weevil within seconds on the original host plant, a rather stunted



Fig. 1. *Charagmus gressorius* climbing on tree lupin, Dawlish Warren, Devon, 2012. Photo: A. Cunningham.

individual of *L. arboreus*. Single specimens were also found on tree lupins in the surrounding area. Comprehensive searching of the site revealed the presence of just a single small female in the dunes half a kilometre away (i.e. two separate sites). The most recorded on a single visit was nine individuals including three pairs in copulation on the original host plant on the 8 June. Improved weather would probably have resulted in the discovery of greater numbers. The final date on which the weevil was observed was 16 June 2012. A fourth visit was made on the 30 July 2012 but none was seen suggesting the adult stage was possibly over for the year. Little is known of the larval feeding stages due to the difficulty of observing its subterranean larval habit. It is reported that females emerge as adults during May, June and July to mate and lay eggs. The resulting larvae feed on the roots with mature larvae feeding on the root surfaces with the pupation stage taking place in the soil (www.coleoptera.ksib.pl).

A translated species account for *C. gressorius* in *Die Rüsselkäfer Baden-Württembergs* (Rheinheimer & Hassler, 2010) indicates the species prefers *Lupinus* but is not entirely dependent on it and favours warm sandy areas which applies to Dawlish Warren. Host plants quoted by Velázquez de Castro, Friedman & Borovec (2010) include *Cytisus*, *Genista*, *Lupinus* and *Ornithopus* with the species also having been collected on a *Trifolium* sp. in Israel. Germann (2009) says it was discovered specifically on *Genista pilosa* in Switzerland. In Germany it is occasionally reported as a pest of *Lupinus* spp. as it can damage their appearance, but it does not occur on

commercial legume crops in any numbers and is of no real economic importance. The weevil occurs mainly on *Lupinus* and *Cytisus* spp. in France. Here it has a mainly southerly distribution but it has been reported in the north from Vienne (8.viii.2006), Essonne (12.iv.2007), Maine-et-Loire (22.ix.2007) and Ille-et-Vilaine, Brittany (9.x.2012) (O. Courtin, pers. comm.). The distribution table for the species on the Fauna Europaea website shows that it is present in the majority of European countries, extending along the western seaboard from Portugal and Spain in the south to Sweden in the north. It also occurs in north Africa. The evidence indicates *C. gressorius* is an oligophagous species, preferring *Lupinus* spp. but eating plants from a wide range of other fabaceous genera.

There are extensive stands of *L. arboreus* at Dawlish Warren. *Lupinus arboreus* is not a native plant and the management plans for the area involve its gradual removal to allow natural dune flora to re-establish. Should *C. gressorius* establish itself in the area then it might provide a measure of natural control of *L. arboreus*. This may be slightly ambitious thinking though, as similar ideas were mooted about the ability of the aphid *M. albifrons* to control lupin during its expansionary phase in the UK in the 1970s, whereas numbers of aphids and plants now appear to have stabilised. The NBN Gateway distribution map for *L. arboreus* shows there are established stands of this plant at other coastal localities in the UK notably in west Cornwall, Norfolk and Hampshire where *C. gressorius* might be expected to occur. *Charagmus griseus* is also present in Devon (Clive Turner pers. com.) including the south coast and so could also potentially be found at Dawlish Warren. The presence of this closely related species needs to be borne in mind when identifying specimens of *Charagmus* from sandy habitats.

ROUTE OF ENTRY

Assuming the species is not native, the route by which *C. gressorius* reached Dawlish Warren NNR can only be speculated on at this stage. Although, the beetle is referred to as being a good flier compared to *C. griseus* (Rheinheimer & Hassler, 2010) this does not necessarily mean that it is strong enough to fly directly across the English Channel. Even so it has been able to track the spread of lupins along railway lines in Germany, thereby extending its range considerably (Rheinheimer & Hassler, 2010). If it is capable of flying significant distances across water between hostplant patches then it is more likely to have landed somewhere nearer, along the south-east coast, such as Kent or Sussex rather than in Devon. The beetle should therefore be sought anywhere along the south coast where it might be feeding preferentially on lupins or a range of native fabaceous plants.

The appearance of this species so far west in England, at a site which has been long studied by entomologists suggests that it may have been imported. Long distance dispersal outside an insect species normal range invariably involves some form of human assistance (Gilbert *et al.*, 2004) and this may well be the case here. Long distance transportation into the UK via the horticultural trade is a distinct possibility as lupins and *Cytisus* species are extremely popular garden plants, and appreciable quantities of stock are imported each year from the continental mainland. Since the larval stages of *C. gressorius* are largely subterranean, detection of the larvae in infected stock would be especially difficult. However it is just as likely that a few freshly emerged adults could be transported in early summer at a time when many gardeners visit garden centres to buy large pot-grown lupins expecting them to flower later the same year. Imported weevils or newly emerged adults then have to disperse from garden stock to wild plants, and the chance of this occurring depends on the

number of adult beetles in a single importation, the distance to and patch size of suitable wild hostplants. Large stands of pure *Lupinus* would be particularly attractive.

It is certainly usual for introduced pest species to be detected in horticultural stock before their occurrence in the wild is reported. In this case, there have been no reports of problem *Charagmus* species occurring in wholesale or retail horticultural outlets in the UK. The route of entry of this species into the UK, if it is an import therefore remains a mystery until supporting evidence can be found.

ACKNOWLEDGEMENTS

The author wishes to thank Klaas Reißmann for initial advice on identification as well as a translation of the species account in *Die Rüsselkäfer Baden-Württembergs*. I am also indebted to John Walters and Mark Telfer for their additional identification advice and for referring me to Max Barclay and Mike Morris. Further thanks go to both Mike Morris and Antonio Velázquez for provision of papers and expert advice. Thanks also go to Hervé Brustel, Olivier Courtin, Peter Sprick, Christoph Germann and Terence Hollingworth for information on the species' distribution in Europe and to Phil Chambers, Steve Ayres and Kevin Rylands for sharing their expert knowledge of the nature reserve.

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10th European Congress of Entomology, 2014

The tenth European Congress of Entomology will be held at the University of York, England, 3rd–8th August 2014. The Royal Entomological Society will be hosting the event and details of the programme and accommodation facilities can be found on the Society's website. The first Congress was held in the UK at the University of Reading.

AN ADDENDUM TO SOUTHWOOD & LESTON'S LAND AND WATER BUGS OF THE BRITISH ISLES

ROB RYAN

38 St John Street, Oxford, OX1 2LH

Email: RobRyanBugs@yahoo.co.uk

ABSTRACT

Southwood & Leston (1959) numbered 509 species of Hemiptera-Heteroptera as British. The British list has grown significantly over the last five decades, and this paper presents an additional 85 species of land and water bugs that have been recorded in Britain. For each species, references to articles in the British literature are given, by which they may be identified.

INTRODUCTION

Students of the land and water bugs (Hemiptera-Heteroptera) were once in the enviable position of having a comprehensive textbook, Southwood & Leston (1959), by which every known British species could be identified. However, since the publication of this work, many more species of Heteroptera have been recorded in Britain, some of which are now quite common. Consequently, this text is no longer adequate, by itself, as a guide for the serious student. For several decades, there has been much discussion amongst British heteropterists about a replacement for this seminal work. Alas, this volume has yet to reach print, and there is clearly a need for an interim solution.

The purpose of this short paper is to provide a concise addendum to Southwood & Leston's text, in the form of a list of the species of Heteroptera recorded as British since its publication, together with a list of references to articles in the British literature which provide the essential information for identification. By this means, it is hoped that Southwood & Leston (1959) may continue to serve as a central text for the British Heteroptera, until the much needed replacement is published.

THE LIST

The list of new species (Table 1) has the same scope as that of Southwood & Leston (1959), the geographical British Isles, which includes Eire and excludes the Channel Islands. In this context, the use of 'Britain' and 'British' may seem inappropriate, but all the species in the present list are recorded from the British mainland, although two species are more known from Ireland: *Notostira erratica* (L.) (Woodroffe, 1977) and *Limnopus rufoscutellatus* (Latreille) (Nelson, 1999; Brooke, 2004). The nomenclature and classification are those of Aukema & Rieger (1995–2006), and it should be noted that these are not identical to those of the website Fauna Europaea (<http://www.faunaeur.org>). Where other names for the new species have been used in the British literature, these are also given. A fuller list of synonyms is given by Aukema & Rieger.

Southwood & Leston (1959) numbered each British species sequentially from 1 to 509, and each new species in the present list is numbered to indicate its approximate position within this sequence. This number is that of the last species of the lowest taxon (usually a genus or subgenus) shared with the new species, suffixed with the letter 'A'. Further species inserted at that point take the suffixes 'B', 'C', etc., in the

Table 1. List of the 85 species of Hemiptera-Heteroptera recorded in Britain that are not numbered in Southwood & Leston (1959). Species associated with imported produce are not included, except where they have become established. The nomenclature and classification are those of Aukema & Rieger (1995–2006). The number assigned to each species denotes its approximate position within the sequence of Southwood & Leston.

Species and Classification	References
Cydnidae – Sehirinae – Sehirini	
015A <i>Tritomegas sexmaculatus</i> (Rambur)	Bantock (2011)
Pentatomidae – Pentatominae – Carpocorini	
036A <i>Carpocoris purpureipennis</i> (De Geer)	Barclay & Nau (2001); Collins & Nau (2006)
Pentatomidae – Pentatominae – Pentatomini	
039A <i>Nezara viridula</i> (L.)	Southwood & Leston (1959); Barclay (2004)
039B <i>Rhaphigaster nebulosa</i> (Poda)	Bantock, Notton & Barclay (2011)
Pentatomidae – Pentatominae – Strachiini	
040A <i>Eurydema ornata</i> (L.)	Slade, Collins & Nau (2005)
[Formerly <i>Eurydema ornatum</i> (L.)]	
Pentatomidae – Asopinae	
045A <i>Jalla dumosa</i> (L.)	Southwood & Leston (1959)
Coreidae – Coreinae – Anisoscelini	
050A <i>Leptoglossus occidentalis</i> Heidemann	Malumphy <i>et al.</i> (2008); Dusouliez <i>et al.</i> (2008)
Rhopalidae – Rhopalinae – Rhopalini	
058A <i>Stictopleurus abutilon</i> (Rossi)	Southwood & Leston (1959)
062A <i>Liorhyssus hyalinus</i> (F.)	Southwood & Leston (1959); Judd (2011)
062B <i>Brachycarenum tigrinus</i> (Schilling)	Jones (2004)
Stenocephalidae	
067A <i>Dicranocephalus albipes</i> (F.)	Southwood & Leston (1959)
Lygaeidae – Blissinae	
073A <i>Ischnodemus quadratus</i> Fieber	Southwood & Leston (1959)
[Formerly <i>Ischnodemus sabuleti quadratus</i> Fieber]	
Lygaeidae – Orsillinae – Nysiini	
075A <i>Nysius ericae</i> (Schilling)	Woodroffe (1960b); Dolling (2003)
075B <i>Nysius graminicola</i> (Kolenati)	Allen (1984); Dolling (2003)
075C <i>Nysius senecionis</i> (Schilling)	Hodge & Porter (1997); Dolling (2003)
075D <i>Nysius cymoides</i> (Spinola)	Dolling (2003); Nau (2004)
075E <i>Nysius huttoni</i> White	Aukema (2005); Cumming (2008)
Lygaeidae – Orsillinae – Orsillini	
076A <i>Orsillus depressus</i> (Mulsant & Rey)	Hawkins (1989)
Lygaeidae – Rhyparochrominae – Rhyparochromini	
085A <i>Peritrechus convivus</i> (Stål)	Southwood & Leston (1959)
[Formerly <i>Peritrechus distinguendus</i> (Flor)]	
094A <i>Rhyparochromus vulgaris</i> (Schilling)	Nau (2010)
Lygaeidae – Rhyparochrominae – Megalonotini	
093A <i>Megalonotus sabulicola</i> (Thomson)	Southwood (1963)
093B <i>Megalonotus emarginatus</i> (Rey)	Aukema & Nau (1992)
093C <i>Sphragisticus nebulosus</i> (Fallén)	Judd (2010)
Lygaeidae – Rhyparochrominae – Gonianotini	
096A <i>Trapezonotus dispar</i> Stål	Southwood & Leston (1959); Woodroffe (1960a)
[Formerly <i>Trapezonotus quadratus</i> (F.)]	
096B <i>Trapezonotus desertus</i> Seidenstucker	Southwood & Leston (1959); Woodroffe (1960a)
100A <i>Pterotmetus staphyliniformis</i> (Schilling)	Woodroffe (1962a)
100B <i>Emblethis denticollis</i> Horváth	Judd & Straw (1998)

Table 1. (*Continued*)

Species and Classification	References
Lygaeidae – Rhyparochrominae – Drymini	
126A <i>Eremocoris abietis</i> (L.)	Woodroffe (1962b)
127A <i>Taphropeltus hamulatus</i> (Thomson)	Woodroffe (1959b); Southwood & Leston (1959)
Lygaeidae – Lygaeinae	
130A <i>Lygaeus equestris</i> (L.)	Southwood & Leston (1959)
130D <i>Lygaeus simulans</i> Deckert	Judd (1996)
130E <i>Arocatus longiceps</i> Stål	Nau & Straw (2007); Barclay (2009)
Lygaeidae – Oxycareninae	
130B <i>Metopoplax ditomoides</i> (A. Costa)	Woodroffe (1953); Southwood & Leston (1959)
130F <i>Metopoplax fuscinervis</i> Stål	Harvey (2008); (pers. comm. Dr. Peter Kirby)
130C <i>Macroplax preysleri</i> (Fieber)	Dolling (1970)
Tingidae – Tinginae	
156A <i>Stephanitis takeyai</i> Drake & Maa	Halstead & Malumphy (2003)
168A <i>Corythucha ciliata</i> (Say)	Malumphy, Reid & Eyre (2007)
Reduviidae – Stenopodainae	
172A <i>Oncocephalus pilicornis</i> Reuter	Whitehead (2006)
Reduviidae – Harpactorinae – Harpactorini	
174A <i>Coranus woodroffei</i> P.V. Putshkov	Woodroffe (1959a)
[Corresponds to the ‘heath’ form of Woodroffe (pers. comm. Dr. Peter Kirby)]	
Nabidae – Prostemmaatinae – Prostemmaatini	
186A <i>Prostemma guttula</i> (F.)	Southwood & Leston (1959)
Anthocoridae – Anthocorinae – Anthocorini	
188A <i>Temnostethus tibialis</i> Reuter	Woodroffe (1971a)
198A <i>Anthocoris pilosus</i> (Jakovlev)	Southwood & Leston (1959)
198B <i>Anthocoris amplicollis</i> Horváth	Crossley (1982)
198C <i>Anthocoris minki</i> Dohrn	Jessop (1983)
[The <i>Anthocoris minki</i> of Southwood & Leston is actually <i>Anthocoris simulans</i> Reuter]	
Anthocoridae – Anthocorinae – Oriini	
203A <i>Orius laticollis</i> (Reuter)	Woodroffe (1971b)
Anthocoridae – Lyctocorinae – Dufouriellini	
213A <i>Buchananiella continua</i> (White)	Kirby (1999)
Microphysidae	
219A <i>Loricula ruficeps</i> (Reuter)	Eversham (1985); (pers. comm. Dr. Peter Kirby)
Miridae – Deraeocorinae – Deraeocorini	
231A <i>Deraeocoris flavilinea</i> (A. Costa)	Miller (2001)
Miridae – Phylinae – Phylini	
237A <i>Conostethus venustus</i> (Fieber)	Flanagan (2011)
246A <i>Macrotylus horvathi</i> (Reuter)	Hodge (2006); Nau (2006b); Bantock (2009)
256A <i>Psallus montanus</i> Josifov	Nau (2007)
[Formerly <i>Psallus betuleti montanus</i> Josifov]	
261A <i>Psallus pseudoplatani</i> Reichling	Hawkins (2003)
276A <i>Atractotomus parvulus</i> Reuter	Woodroffe (1971c)
[Formerly <i>Atractotomus mirificus</i> Woodroffe]	
277A <i>Europiella decolor</i> (Uhler)	Dolling (1999)
281A <i>Chlamydatus pulicarius</i> (Fallén)	Southwood & Leston (1959)
285A <i>Monosynamma maritimum</i> (Wagner)	Woodroffe (1967a)
[Formerly <i>Monosynamma maritima</i> (Wagner)]	
285B <i>Monosynamma sabulicola</i> (Wagner)	Woodroffe (1967a); Nau (2000)
286A <i>Campylomma annulicorne</i> (Signoret)	Nau (1978)
[Formerly <i>Campylomma annulicornis</i> (Signoret)]	
290A <i>Placochilus seladonicus</i> (Fallén)	Nau (1978)
290B <i>Tuponia mixticolor</i> (A. Costa)	Nau (1980)
[Formerly <i>Tuponia carayoni</i> Wagner]	
290C <i>Tuponia brevirostris</i> Reuter	Barclay & Nau (2003)

Table 1. (Continued)

Species and Classification	References
Miridae – Phylinae – Pilophorini	
307A <i>Hypseloecus visci</i> (Puton)	Gibbs & Nau (2005)
Miridae – Bryocorinae – Dicyphini	
299A <i>Dicyphus escalerae</i> Lindberg	Kirby, Bantock & Nau (2009)
299B <i>Dicyphus pallidus</i> (Herrich-Schaeffer)	Ryan (2010)
303A <i>Tupiocoris rhododendri</i> (Dolling)	Dolling (1971)
[Formerly <i>Dicyphus rhododendri</i> Dolling and <i>Neodicyphus rhododendri</i> (Dolling)]	
Miridae – Orthotylinae – Orthotylini	
344A <i>Orthotylus caprai</i> Wagner	Ryan (2008)
350A <i>Brachynotocoris puncticornis</i> Reuter	Nau & Brooke (2007)
350B <i>Reuteria marqueti</i> Puton	Brooke & Nau (2007)
Miridae – Mirinae – Mirini	
364A <i>Orthops basalis</i> (A. Costa)	Woodroffe (1973)
370A <i>Apolygus limbatus</i> (Fallén)	Southwood & Leston (1959)
[Formerly <i>Lygocoris limbatus</i> (Fallén)]	
378A <i>Charagochilus weberi</i> Wagner	Woodroffe (1965)
387A <i>Closterotomus trivialis</i> (A. Costa)	Bantock (2010a)
409A <i>Hadrodemus m-flavum</i> (Goeze)	Southwood & Leston (1959)
409B <i>Zygimus nigriceps</i> (Fallén)	Scudder (1958); Southwood & Leston (1959)
Miridae – Mirinae – Stenodemini	
415A <i>Notostira erratica</i> (L.)	Woodroffe (1977)
418A <i>Trigonotylus caelestialium</i> (Kirkaldy)	Aukema & Nau (1992)
421A <i>Teratocoris caricis</i> Kirkaldy	Woodroffe (1967b)
[Formerly <i>Teratocoris elegans</i> Woodroffe]	
Saldidae – Saldinae – Saldoidini	
442A <i>Saldula melanoscela</i> (Fieber)	Hewitt (2001)
Gerridae – Gerrinae – Gerrini	
467A <i>Limnaporus rufoscutellatus</i> (Latreille)	Southwood & Leston (1959); Savage (1989)
[Formerly <i>Gerris rufoscutellatus</i> (Latreille)]	
Naucoridae – Naucorinae	
470A <i>Naucoris maculatus</i> F.	Nau & Brooke (2005)
Corixidae – Micronectinae	
479A <i>Micronecta griseola</i> Horváth	Brooke & Nau (2003)
Corixidae – Cymatiainae	
481A <i>Cymatia rogenhoferi</i> (Fieber)	Nau & Brooke (2006)
Corixidae – Corixinae – Corixini	
488A <i>Corixa iberica</i> Jansson	Savage (1989)
501A <i>Sigara iactans</i> Jansson	Nau & Brooke (2006)
501B <i>Sigara longipalis</i> (J. Sahlberg)	Blackburn (2007)

historical order of the first British record. A modern treatment of Southwood & Leston’s list would produce a very different numbering, due both to changes in taxonomy and to the modern practice of listing taxa in alphabetical order. It is for this reason that a more precise placement of the new species has not been attempted.

In addition to the 509 numbered species, there are many other species presented in Southwood & Leston (1959) that are unnumbered, due to their being regarded as ‘foreign’ or ‘doubtful’. There is an obvious difficulty in deciding whether an occasional migrant is or is not a British species, and there are some apparent inconsistencies in the decisions made by the authors with some species. For instance,

two species of *Stictopleurus* Stål (Rhopalidae) were, at the time, rare visitors to Britain (Dolling, 1978), but *S. punctatonervosus* (Goeze) was numbered and keyed, whereas *S. abutilon* (Rossi) achieved neither distinction. For the sake of consistency, all unnumbered species in Southwood & Leston (1959) have been included in the present list, and given a number, with the exception of those that are associated with imported produce and which have not become established. Nineteen of the species listed in Table 1 fall into this category.

New species that have arisen through mistaken identity are not included in the list, except where multiple species are involved, and there is therefore a net addition to the list. For instance, *Orius vicinus* (Ribaut) (Anthocoridae) (Woodroffe, 1971b) and *Anthocoris simulans* Reuter (Anthocoridae) (Jessop, 1983) are not included as they replace the entries for existing species. However, in the confusion over *Plagiognathus albipennis* (Fallén) (Miridae), two species arose: *Europiella artemisiae* (Becker) and *E. decolor* (Uhler) (Dolling, 1999). The former is taken to replace *P. albipennis*, and the latter is therefore regarded as an addition to the list. The above and the many other changes in nomenclature of Southwood & Leston's species are fully documented by Nau (2006a), and are summarised in Table 2.

There are two species that were recorded as new to Britain, but are no longer regarded as distinct species, and are therefore excluded from the list: *Piesma spergulariae* Woodroffe (Piesmatidae) (Woodroffe, 1966) and *Empicoris thermalis* (Dohrn) (Reduviidae) (O'Connor & O'Connor, 1993; Southwood, 2000). *Kleidocerys privignus* (Horváth) (Lygaeidae) is also not included due to its doubtful status (pers. comm. Dr. Peter Kirby). There is also some uncertainty over the elevation of *Glaenocoris propinqua cavifrons* (Thomson) (Corixidae) to specific rank (pers. comm. Dr. Bernard Nau), and *Glaenocoris cavifrons* is therefore not included. There are two species of bugs that have recently been captured in Britain and photographs uploaded to the website Flickr (<http://www.flickr.com>) by Dr. Tristan Bantock – *Orthotylus junipericola* Linnavuori and *Tropidosteptes pacificus* (Van Duzee) (Miridae) – but details of their British status have yet to be published, and these species are not therefore included in the present list.

THE REFERENCES

It is beyond the scope of the present paper to provide individual details of the 85 species listed in Table 1, beyond their name and classification. The cited references to articles in the British literature contain the essential information which may be used for identification. These include, for each species, the first report of the species as new to Britain, with additional references where more details are required. A number of these articles are available on the internet, and it is hoped that for the remainder the reader will have access to the necessary library facilities where these articles may be found. There are, of course, continental European texts which may be useful for identification, such as Stichel (1955–1962) and the many excellent volumes by the late Jean Péricart, but these can be difficult to obtain in Britain, and require skills in the relevant foreign language. Some groups of the British Heteroptera have more modern treatments – the shieldbugs & squashbugs (Evans & Edmondson, 2005) and the water bugs (Savage, 1989) – but these texts present only a small minority of the species listed in this paper. Colour images of the insects may, in many cases, be found by searching the internet, although these are sometimes incorrectly named, and care needs to be taken. The British Bugs website (<http://www.britishbugs.org.uk>) is an ideal starting point for a search for images, followed by Flickr (<http://www.flickr.com>), Google (<http://www.google.co.uk>) and other internet search engines. The web journal *Het News* (<http://www.hetnews.org.uk>) contains a wealth of useful articles on

Table 2. List of the 91 species of British Hemiptera-Heteroptera whose names have changed since Southwood & Leston (1959), with their equivalent names in Aukema & Rieger (1995–2006), summarised from Nau (2006a).

No. and Name in Southwood & Leston (1959)	Name in Aukema & Rieger (1995–2006)
015 <i>Sehirus bicolor</i> (Linnaeus)	<i>Tritomegas bicolor</i> (Linnaeus)
016 <i>Sehirus dubius</i> (Scopoli)	<i>Canthophorus impressus</i> (Horváth)
017 <i>Sehirus biguttatus</i> (Linnaeus)	<i>Adomerus biguttatus</i> (Linnaeus)
019 <i>Aethus flavicornis</i> (Fabricius)	<i>Byrsinus flavicornis</i> (Fabricius)
022 <i>Odontoscelis dorsalis</i> (Fabricius)	<i>Odontoscelis lineola</i> Rambur
031 <i>Eysarcoris fabricii</i> Kirkaldy	<i>Eysarcoris venustissimus</i> (Schrank)
033 <i>Holcostethus vernalis</i> (Wolff)	<i>Holcostethus strictus</i> (Fabricius)
050 <i>Spathocera dahlmanni</i> (Schilling)	<i>Spathocera dalmanii</i> (Schilling)
052 <i>Arenocoris waltli</i> (Herrich-Schaeffer)	<i>Arenocoris waltlii</i> (Herrich-Schaeffer)
059 <i>Aeschyntelus maculatus</i> (Fieber)	<i>Rhopalus maculatus</i> (Fieber)
064 <i>Chorosoma schillingi</i> (Schummel)	<i>Chorosoma schillingii</i> (Schilling)
078 <i>Kleidocerys truncatulus</i> (Walker)	<i>Kleidocerys ericae</i> (Horváth)
081 <i>Peritrechus lundi</i> (Gmelin)	<i>Peritrechus lundii</i> (Gmelin)
088 <i>Graptopeltus brevirostris</i> Ribaut	<i>Xanthochilus quadratus</i> (Fabricius)
100 <i>Emblethis verbasci</i> (Fabricius)	<i>Emblethis griseus</i> (Wolff)
105 <i>Stygnocoris pedestris</i> (Fallén)	<i>Stygnocoris sabulosus</i> (Schilling)
128 <i>Taphropeltus limbatus</i> (Fieber)	<i>Notochilus limbatus</i> Fieber
134 <i>Cymus obliquus</i> Horváth	<i>Cymus aurescens</i> Distant
145 <i>Piesma quadratum</i> Fieber	<i>Parapiesma quadratum</i> (Fieber)
149 <i>Acalypta platychila</i> (Fieber)	<i>Acalypta platycheila</i> (Fieber)
154 <i>Dictyonota tricornis</i> (Schrank)	<i>Kalama tricornis</i> (Schrank)
167 <i>Monanthia humuli</i> (Fabricius)	<i>Dictyla convergens</i> (Herrich-Schaeffer)
168 <i>Agramma laeta</i> (Fallén)	<i>Agramma laetum</i> (Fallén)
183 <i>Stalia major</i> (Costa)	<i>Himacerus major</i> (A. Costa)
184 <i>Stalia boops</i> (Schjødte)	<i>Himacerus boops</i> (Schjødte)
185 <i>Dolichonabis limbatus</i> (Dahlbom)	<i>Nabis limbatus</i> Dahlbom
186 <i>Dolichonabis lineatus</i> (Dahlbom)	<i>Nabis lineatus</i> Dahlbom
191 <i>Anthocoris minki</i> Dohrn	<i>Anthocoris simulans</i> Reuter
203 <i>Orius minutus</i> (Linnaeus)	<i>Orius vicinus</i> (Ribaut)
220 <i>Myrmedobia tenella</i> (Zetterstedt)	<i>Myrmedobia exilis</i> (Fallén)
224 <i>Myrmedobia bewelli</i> China	<i>Myrmedobia coleoptrata</i> (Fallén)
235 <i>Conostethus friscus</i> Wagner	<i>Conostethus griseus</i> Douglas & Scott
238 <i>Hoplomachus thunbergi</i> (Fallén)	<i>Hoplomachus thunbergii</i> (Fallén)
241 <i>Megalocoleus pilosus</i> (Schrank)	<i>Megalocoleus tanaceti</i> (Fallén)
250 <i>Tytthus geminus</i> (Flor)	<i>Tytthus pubescens</i> (Knight)
252 <i>Phylus pallipes</i> Fieber	<i>Phylus palliceps</i> Fieber
255 <i>Plesiodema pinetellum</i> (Zetterstedt)	<i>Plesiodema pinetella</i> (Zetterstedt)
263 <i>Psallus roseus</i> (Fabricius)	<i>Psallus haematodes</i> (Gmelin)
267 <i>Psallus alnicola</i> Douglas & Scott	<i>Psallus salicis</i> (Kirschbaum)
268 <i>Psallus diminutus</i> (Kirschbaum)	<i>Psallus confusus</i> Rieger
269 <i>Psallus masseei</i> Woodroffe	<i>Psallus mollis</i> (Mulsant & Rey)
272 <i>Psallus obscurellus</i> (Fallén)	<i>Phoenicocoris obscurellus</i> (Fallén)
274 <i>Psallus salicellus</i> (Herrich-Schaeffer)	<i>Compsidolon salicellum</i> (Herrich-Schaeffer)
277 <i>Plagiognathus albipennis</i> (Fallén)	<i>Europiella artemisiae</i> (Becker)
280 <i>Plagiognathus vitellinus</i> (Scholtz)	<i>Parapsallus vitellinus</i> (Scholtz)
285 <i>Monosynamma bohemani</i> (Fallén)	<i>Monosynamma bohemanni</i> (Fallén)
287 <i>Sthenarus roseri</i> (Herrich-Schaeffer)	<i>Salicarus roseri</i> (Herrich-Schaeffer)
289 <i>Asciodema obsoletum</i> Fieber	<i>Asciodema obsoleta</i> (Fieber)
290 <i>Asciodema fieberi</i> (Douglas & Scott)	<i>Psallodema fieberi</i> (Fieber)

Table 2. (Continued)

No. and Name in Southwood & Leston (1959)	Name in Aukema & Rieger (1995–2006)
295 <i>Macrolophus nubilis</i> (Herrich-Schaeffer)	<i>Macrolophus pygmaeus</i> (Rambur)
319 <i>Cyllecoris histrionicus</i> (Linnaeus)	<i>Cyllecoris histrionius</i> (Linnaeus)
321 <i>Globiceps cruciatus</i> Reuter	<i>Globiceps fulvicollis</i> Jakovlev
322 <i>Globiceps salicicola</i> Reuter	<i>Globiceps juniperi</i> Reuter
326 <i>Heterotoma merioptera</i> (Scopoli)	<i>Heterotoma planicornis</i> (Pallas)
328 <i>Pachylops bicolor</i> (Douglas & Scott)	<i>Platycranus bicolor</i> (Douglas & Scott)
345 <i>Orthotylus diaphanus</i> (Kirschbaum)	<i>Blepharidopterus diaphanus</i> (Kirschbaum)
348 <i>Neomecomma bilineatus</i> (Fallén)	<i>Orthotylus bilineatus</i> (Fallén)
352 <i>Pithanus maerkeli</i> (Herrich-Schaeffer)	<i>Pithanus maerkelii</i> (Herrich-Schaeffer)
359 <i>Orthops atomarius</i> (Meyer-Dür)	<i>Pinalitus atomarius</i> (Meyer-Dür)
360 <i>Orthops rubricatus</i> (Fallén)	<i>Pinalitus rubricatus</i> (Fallén)
361 <i>Orthops cervinus</i> (Herrich-Schaeffer)	<i>Pinalitus cervinus</i> (Herrich-Schaeffer)
362 <i>Orthops viscicola</i> (Puton)	<i>Pinalitus viscicola</i> (Puton)
364 <i>Orthops kalmi</i> (Linnaeus)	<i>Orthops kalmii</i> (Linnaeus)
369 <i>Lygocoris spinolai</i> (Meyer-Dür)	<i>Apolygus spinolae</i> (Meyer-Dür)
370 <i>Lygocoris lucorum</i> (Meyer-Dür)	<i>Apolygus lucorum</i> (Meyer-Dür)
372 <i>Camptozygum pinastri</i> (Fallén)	<i>Camptozygum aequale</i> (Villers)
373 <i>Plesiocoris rugicollis</i> (Fallén)	<i>Lygocoris rugicollis</i> (Fallén)
377 <i>Polymerus nigritus</i> (Fallén)	<i>Polymerus nigrita</i> (Fallén)
378 <i>Charagochilus gyllenhalii</i> (Fallén)	<i>Charagochilus gyllenhalii</i> (Fallén)
380 <i>Dichrooscytus valesianus</i> (Meyer-Dür)	<i>Dichrooscytus gustavi</i> Josifov
382 <i>Calocoris quadripunctatus</i> (Villers)	<i>Rhabdomiris striatellus</i> (Fabricius)
383 <i>Calocoris sexguttatus</i> (Fabricius)	<i>Grypocoris stysi</i> (Wagner)
384 <i>Calocoris fulvomaculatus</i> (De Geer)	<i>Closterotomus fulvomaculatus</i> (De Geer)
385 <i>Calocoris major</i> (Schilling)	<i>Calocoris alpestris</i> (Meyer-Dür)
387 <i>Calocoris norvegicus</i> (Gmelin)	<i>Closterotomus norvegicus</i> (Gmelin)
410 <i>Acetropis gimmerthali</i> (Flor)	<i>Acetropis gimmerthalii</i> (Flor)
411 <i>Stenodema calcaratum</i> (Fallén)	<i>Stenodema calcarata</i> (Fallén)
412 <i>Stenodema trispinosum</i> Reuter	<i>Stenodema trispinosa</i> Reuter
413 <i>Stenodema laevigatum</i> (Linnaeus)	<i>Stenodema laevigata</i> (Linnaeus)
414 <i>Stenodema holsatum</i> (Fabricius)	<i>Stenodema holsata</i> (Fabricius)
424 <i>Ceratocombus coleoptrata</i> (Zetterstedt)	<i>Ceratocombus coleoptratus</i> (Zetterstedt)
425 <i>Pachycoleus rufescens</i> Sahlberg	<i>Cryptostemma waltli</i> (Fieber)
436 <i>Saldula vestita</i> (Douglas)	<i>Saldula fucicola</i> (J. Sahlberg)
447 <i>Chartoscirta cocksi</i> (Curtis)	<i>Chartoscirta cocksii</i> (Curtis)
458 <i>Microvelia umbricola</i> Wroblewski	<i>Microvelia buenoi</i> Drake
462 <i>Gerris costai</i> (Herrich-Schaeffer)	<i>Gerris costae</i> (Herrich-Schaeffer)
474 <i>Notonecta marmorea</i> Fabricius	<i>Notonecta viridis</i> Delcourt
476 <i>Plea atomaria</i> (Pallas)	<i>Plea minutissima</i> Leach
481 <i>Cymatia bonsdorffii</i> (Sahlberg)	<i>Cymatia bonsdorffii</i> (C. R. Sahlberg)
490 <i>Hesperocorixa linnei</i> (Fieber)	<i>Hesperocorixa linnaei</i> (Fieber)
504 <i>Sigara concinna</i> (Fieber)	<i>Paracorixa concinna</i> (Fieber)

the British Heteroptera, including many of the species listed in this paper, and is the best place to learn of the very latest additions to the British list.

CONCLUSION

This paper adds 85 species to the 509 numbered in Southwood & Leston (1959), making a total of 594. The number of species that are truly British is more difficult to determine precisely, as it depends upon the view taken of their status, particularly in

regard to the frequency and age of records. Eight of the listed species (*Jalla dumosa* (L.), *Dicranocephalus albipes* (F.), *Lygaeus equestris* (L.), *Lygaeus simulans* Deckert, *Prostemma guttula* (F.), *Anthocoris pilosus* (Jakovlev), *Apolygus limbatus* (Fallén) and *Hadrodemus m-flavum* (Goeze)) have no modern records, and Nau (2006a) reports a further eight such species from the original 509, although one of these, *Eremocoris fenestratus* (Herrich-Schaeffer) (Lygaeidae), has recently been found again in Britain (Bantock, 2010b). Furthermore, the British status of some species rests upon single specimens – *Oncocephalus pilicornis* Reuter (Whitehead, 2006), *Loricula ruficeps* (Reuter) (pers. comm. Dr. Peter Kirby) and *Reuteria marqueti* Puton (Brooke & Nau, 2007) – which may therefore be considered doubtful. It may also be prudent to exclude species very recently new to Britain, until they have properly established themselves. However, even if a highly conservative point of view is taken, the number of species considered British is unlikely to fall below 570.

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PLATE 13. Range of colour forms of the groundhopper *Tetrix subulata* in South Lancashire. Fig. 1. Range Pond, Formby, 39.iv.2011. Fig. 2. Birkdale, 28.iv.2011. Fig. 3. Freshfield Heath, 29.viii.2011. Fig. 4. Cabin Hill, 30.iv.2011. Photos: P. Smith.



PLATE 14. Fig. 1. *Chionaspis xanthorrhoeae* adult female scale on *Xanthorrhoea* sp. Fig. 2. *C. xanthorrhoeae* scale cover turned over to show the orange body of the adult female (right) and yellow eggs (left). Fig. 3. *Fusilaspis phymatodidis* adult female scales and necrosis of the foliage of *Dicksonia antarctica*. Fig. 4. *F. phymatodidis* scale cover removed to show the pale-yellow adult female beneath. Fig. 5. *Pseudaulacaspis brimblecombei* adult female scales with crawlers dispersing over the leaf. Fig. 6. *P. brimblecombei* scale cover turned over to show the pale orange body of the adult female (top right) and yellow eggs (left).



PLATE15. Figs. 1–2. Adult male *Pithytettix abietinus*, lateral and dorsal views. Photos: J. Denton. Fig. 3. *Charagmus gressorius* on tree lupin, Dawlish Warren, Devon, 18.vi.2012. Photo: A. Cunningham. Fig. 4. Empty 'pupal' cases and live puparia of *Siphoninus phillyreae* on ash, Cliffe, Kent, 22.x.2012. Photo: J. Shorter.



PLATE 16. Fig. 1. A male *Ontholestes tessellatus* killing a female *Calliphora vicina* by delivering fatal bites to the frons area. Photo: Kevin McGee. Fig. 2. *Conops vesicularis* on spindle foliage. Broxbourne Wood, Herts. 29.v.2012. Photo: Kevin McGee.

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SHORT COMMUNICATIONS

New records of ash whitefly *Siphoninus phillyreae* (Halliday) (Hemiptera: Aleyrodidae) in Kent. – The whitefly records for Kent were recently summarized by Malumphy & Badmin (2012). A total of thirteen species are currently known from VCs 15 and 16, though several have not been recorded for many years. Ash whitefly *Siphoninus phillyreae* (Halliday) (Plate 15, Fig. 4) is a typical example with just two records, from Beckenham, West Kent dating from 1950 (C. B. Williams) to as recently as 1988 (J. H. Martin).

Searches this year have revealed that ash whitefly is more widespread in the county than previously understood. The authors discovered this species at sites throughout Medway (VC15) and also at Ranscombe Farm, Cuxton VC16 (TQ711673, TQ702679) on 25.x.2012 and near Brogdale VC15 on 10.x.2012 (TR006597). At all of these sites, occupied host plants were either in areas of woodland, often ancient, or in substantial hedgerows or gardens. Initial observations indicated the whitefly was almost completely absent from ash trees away from such habitats. Whether this was due to distance, temperature limitations on population growth, winter exposure (both likely)

or lack of alternative hosts (less so) has yet to be determined. Certainly, whitefly density appeared to be greatest in more sheltered locations.

A request for more records of *S. phillyreae* at the 2012 autumn Kent Wildlife Conference resulted in four additional sites for this species in the county. These are: VC 16 – New Barn (TQ627687) on 21.x.2012, Peter and Pauline Heathcote; Cliffe, Isle of Grain (TQ739731) on 22.x.2012 and Randall Wood, Shorne Country Park (TR006597), Judith Shorter; and VC 15 – Chestfield (TR136664) on 20.x.2012, Hazel Ryan and John Puckett. The absence of the species on ash in exposed amenity locations was noted in some of these locations. A recent search of ash trees in Faversham proved negative (John Badmin, pers. comm.). SIMON SPRINGATE & SARAH E. J. ARNOLD, Natural Resources Institute, University of Greenwich, Chatham Maritime ME4 4TB.

REFERENCE

Malumphy, C. & Badmin, J. S. 2012. Scale insects and whiteflies (Hemiptera: Coccoidea and Aleyrodoidea) of Watsonian Kent: with a discussion of the impact of naturalized non-native species. *British Journal of Entomology and Natural History* 25: 15–46.

***Ontholestes tessellatus* (Geoffroy) (Coleoptera: Staphylinidae) capturing and killing *Calliphora vicina* (Robineau-Desvoidy) (Diptera: Calliphoridae).** – An observation of a male rove beetle *Ontholestes tessellatus* (Geoffroy) successfully attacking and killing a female bluebottle fly *Calliphora vicina* (Robineau-Desvoidy) is described. On 30.v.2012 a visit was made to Broxbourne Woods NNR, VC 20, Hertfordshire (TL325069). Along a shady path through mixed coniferous and broad-leaved woodland a fresh mound of horse dung had attracted large numbers of flies, the majority of which were bluebottles of the family Calliphoridae. There appeared to be hundreds swarming and jostling for position on and around the dung. Upon approach it was noticed that a struggle was occurring on the ground inches from the dung. Closer inspection revealed that a species of rove beetle had somehow managed to capture a large bluebottle and they were rolling over and wrestling in the dust. Several photographs were taken of this incident. Looking at the images later, on a computer monitor, it was clear that the rove beetle was *O. tessellatus* and that it had eventually managed to overcome the *Calliphora* by biting into its head to the rear of the frons (Plate 16, Fig. 1). Predatory rove beetles are amongst the most important and abundant members of the dung community (Skidmore, 1991). *Ontholestes tessellatus* is often recorded on or near to cow dung and it would be interesting to know if they are they able to capture adult dung flies in the family Scathophagidae. The dense populations of prey items including fly larvae, mites and springtails found on and in specialised micro-habitats such as dung are known to attract predatory carnivorous rove beetles in the sub-family Staphylininae (Lott & Anderson, 2011). – KEVIN A. MCGEE, 9, Woodrush Heath, The Rock, Telford, Shropshire. TF3 5DL. (email: kevinmcgeeandrena@live.co.uk).

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GREEN COFFEE SCALE *COCCUS VIRIDIS* (HEMIPTERA: COCCIDAE), NEW TO BRITAIN

C. MALUMPHY¹ & K. TRESEDER²

¹*The Food and Environment Research Agency, Sand Hutton, York YO41 1LZ, UK*

Email: chris.malumphy@fera.gsi.gov.uk

²*The Eden Project, Bodelva, St Austell, Cornwall PL24 2SG, UK*

Email: ktreseder@edenproject.com

ABSTRACT

The Neotropical green coffee scale, *Coccus viridis* (Green) (Hemiptera: Coccidae), is reported breeding on indoor plantings in Britain for the first time. It was detected in the Humid Tropic Biome at The Eden Project, Cornwall, England, in November 2010; its origin and pathway of introduction are unknown, although its widespread distribution and abundance within the Biome indicates that it may have been present for several years. It was frequently attended by the white-footed ant *Technomyrmex albipes* Smith (Hymenoptera: Formicidae), which is suspected to have spread the scale within the Biome. The biology, economic importance and geographical distribution of *C. viridis* are reviewed. New host plants reported for *C. viridis* are *Alstonia scholaris* (Apocynaceae), *Garcinia mangostana* (Clusiaceae), *Jasminum* sp. (Oleaceae), *Manicaria* sp. (Arecaceae), *Mormolyca polyphylla* (Orchidaceae) and *Rothmannia annae* (Rubiaceae).

INTRODUCTION

The abundance of soft scales (Hemiptera: Coccidae) in the Humid Tropic Biome at The Eden Project, Cornwall, England, increased between 2008 and 2011. This is suspected to be largely due to the very high levels of white-footed ant *Technomyrmex albipes* Smith (Hymenoptera: Formicidae) which spread the soft scales, remove the honeydew, and may provide some protection against natural enemies. In particular, the population of soft scales on plants of coffee *Coffea arabica* L. (Rubiaceae) increased dramatically during the summer of 2010, monitored by the second author, and required treatment with acetamiprid (Gazelle). Three leaves from an infested coffee plant from the Humid Tropic Biome were collected by the second author in November 2010, passed to Derek Grove of the Plant Health and Seeds Inspectorate (PHSI), and submitted to The Food and Environment Research Agency (FERA) laboratory at Sand Hutton. The scales were identified as *Coccus viridis* (Green) (Hemiptera: Coccidae), commonly known as the green coffee scale. The lower surfaces of the leaves were found to be smothered in several hundred first and second instar nymphs, adult females were observed to form a continuous line either side of the central vein (similar to *C. viridis* on *Ixora* (Rubiaceae), Fig. 1). All stages were also present in lower numbers on the upper surfaces of the leaves. The majority of the scales were dead, presumably due to the insecticide treatment although there was also a low level of parasitism by an unidentified hymenopteran, suspected to be *Metaphycus helvolus* (Compere) (Hymenoptera: Encyrtidae), which was released in the Humid Tropic Biome for bio-control of soft scales (Treseder *et al.*, 2011) and is known to attack *C. viridis* (Universal Chalcidoidea Database, www.nhm.ac.uk). During the summer and autumn of 2011 the population of *C. viridis* continued to increase in the Humid Tropic Biome, however, towards the end of the summer when the humidity was consistently high the scales were substantially colonised by an

entomopathogenic fungus, tentatively identified as *Lecanicillium lecanii* R. Zare & W. Gams (Hypocreales: Clavicipitaceae). The scales were also predated by the ladybird *Cryptolaemus montrouzieri* Mulsant (Coleoptera: Coccinellidae), which was released for biocontrol of mealybugs. During the winter of 2011–2012 the remaining population of *C. viridis* was treated with spirotetramat (Movento), which greatly reduced the number of scales.

Other plants in the Humid Tropic Biome heavily infested with *C. viridis* were sapodilla *Manilkara zapota* (L.) P. Royen (Sapotaceae), Wright's gardenia *Rothmannia annae* (E. Wright) Keay (Rubiaceae) (new host) and red frangipani *Plumeria rubra* L. (Apocynaceae). The foliage of some of the plants was covered in honeydew which served as a medium for the growth of sooty moulds (Ascomycete fungi). None of the infested plants had any recent import connection, and the origin and pathway of introduction of the scale infestation are unknown. Further samples of blackboard tree *Alstonia scholaris* L. R. Br. (Apocynaceae) (new host), mango *Mangifera indica* cv. 'Osteen' (Anacardiaceae), and coffee were taken from the Humid Tropic Biome by the second author in June 2011, and all were found to be heavily infested with *C. viridis* together with *T. albipes*.

Several transient incursions of *C. viridis* have been detected previously on growing plants in England: Berkshire, plant exhibition, on *Mormolyca polyphylla* Garay & Wirth (Orchidaceae) (new host) from Ecuador, 29.vi.2004; London, Chelsea Flower Show, on *Aralia* sp. (Araliaceae) from Grenada, 23.v.2006; Surrey, Wisley, Royal Horticultural Society's Gardens, on sapodilla and cacao *Theobroma cacao* L., (Malvaceae) from Jamaica, 24.iv.2003; on sapodilla from Italy, iii–iv.2007, on *Manicaria saccifera* Gaertn. (Arecaceae) (new host) from a UK nursery, 9.v.2007; West Sussex, on guava *Psidium guajava* L. (Myrtaceae), sapodilla and *Chrysophyllum* sp. (Sapotaceae) from Jamaica (for the Chelsea Flower Show), 16.v.2003. Action was taken in each case to control the scales.

Coccus viridis has also been intercepted by the Plant Health and Seeds Inspectorate on plant produce imported into England on many occasions: East Riding of Yorkshire, wholesaler, on jasmine *Jasminum* sp. (Oleaceae) from Jamaica, 8.ii.2000; Essex, London Stansted Airport, unidentified plant, 26.viii.2005; Port of Tilbury, on lime *Citrus aurantifolia* (Christm.) Swingle (Rutaceae) fruit from Brazil, 24.xi.2005; Greater London, London Heathrow Airport, on mangosteen *Garcinia mangostana* L. (Clusiaceae) (new host) from Indonesia and Thailand, 20.xii.2004, on *Citrus* sp. foliage from Dominican Republic, 24.viii.2004, and lime fruit from Brazil, 20.iii.2007; Hampshire, flower importer, on *Dracaena* sp. (Asparagaceae) from Costa Rica, 8.v.2006; Portsmouth, on lime fruit from the Dominican Republic, 18.i.2007; London, wholesaler, on lime fruit from Brazil, 20.iv.2001; West Sussex, Gatwick Airport, on *Citrus* sp. fruit from the Dominican Republic, 14.vi.2002, 1.viii.2002, on lime fruit from Saint Lucia, 14.iii.2007.

The purpose of this communication is to report the presence of a breeding population of *C. viridis* on indoor plantings at a botanical garden in Britain for the first time; and to review its biology, distribution, economic importance and control.

DETECTION AND IDENTIFICATION

In life adult female *C. viridis* are 2.5–3.3 mm long, elongate-oval to elliptical, moderately convex, shiny yellow to pale green with a conspicuous black, irregular intestine (often U-shaped), and have two distinct black eye spots (Fig. 2). Dead scales are light brown or buff coloured. They often occur in dense colonies that smother the under surfaces of the foliage and along the stems. The adult females frequently line



Fig. 1 Immature female and adult female individuals of *Coccus viridis* on *Ixora* sp (Rubiaceae). © C. Malumphy.

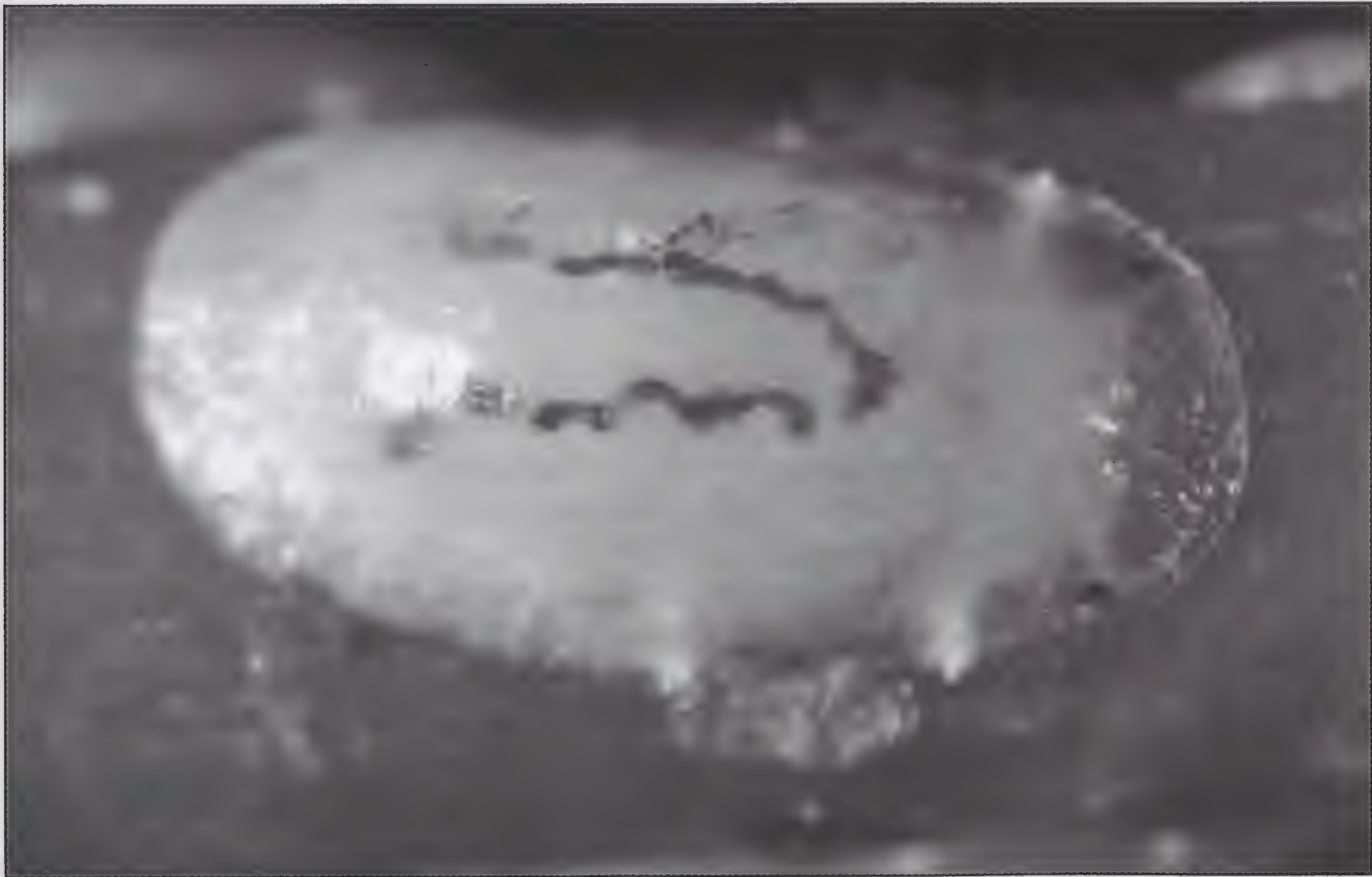


Fig. 2 *Coccus viridis*, close-up of adult females. © Fera.

up along the main leaf vein. The upper surfaces of the leaves of infested plants become covered in sticky honeydew excreted by the scales, which serves as a medium for the growth of black sooty moulds.

There are no species of *Coccus* native to Britain but there is one other species established in Britain, brown soft scale (*Coccus hesperidum* L.). Adult female

C. hesperidum resemble those of *C. viridis* but they are often larger, do not have the internal black U-shaped marking and the eyespots are usually less conspicuous. *Coccus hesperidum* is by far the most common species of soft scale on indoor plantings throughout Britain and is frequently a serious pest of ornamental plants (Malumphy, 2009, 2010). It is very common outdoors on evergreen plants particularly in urban areas, but the first author has in recent years, recorded it outdoors in more rural situations (e.g., in North Yorkshire). The species has been established in Britain on indoor plantings since at least the 1840s (Curtis, 1843, as *Coccus patellaeformis*), and has been naturalised outdoors (in London) for more than a century. It is cosmopolitan and extremely polyphagous, having been recorded feeding on several hundred host species assigned to at least 120 plant families.

Two other species of *Coccus* have previously been recorded as present in Britain, long brown scale *Coccus longulus* (Douglas) and orchid soft scale *Coccus pseudoheperidum* (Cockerell), but they are not currently present in Britain. *Coccus longulus* was originally described from The Royal Botanic Gardens Kew, Surrey (Douglas, 1887) and was apparently established for several years (Green, 1897). It is broadly polyphagous, and occurs widely in the tropics and subtropics. *Coccus pseudoheperidum* was recorded once, in a private orchid collection in Surbiton, London (Green, 1920, 1921). It is oligophagous on Orchidaceae and occurs in North, Central and South America, Hawaii, and is occasionally found in glasshouses in Europe (Boratynski & Williams, 1964; Ben-Dov, 1993, 2011; Koteja *et al.*, 1998).

Morphological descriptions and illustrations of adult female *C. viridis* and keys for the identification of *Coccus* are provided by Gill *et al.* (1977), Hamon & Williams (1984) and Williams & Watson (1990).

HOST RANGE AND BIOLOGY

Coccus viridis is broadly polyphagous and is recorded feeding on plants belonging to at least 61 families, including many crop and ornamental plants. The most important host families are Rubiaceae and Rutaceae, followed by Apocynaceae, Euphorbiaceae and Myrtaceae.

The most economically important host plant families and genera include: **Arecaceae**, *Areca*, *Cocos*; **Asparagaceae**, *Dracaena*; **Asteraceae**, *Gerbera*, *Senecio*; **Boraginaceae**, *Cordia*; **Bromeliaceae**, *Ananas*; **Clusiaceae**, *Mammea*; **Combretaceae**, *Terminalia*; **Crassulaceae**, *Bryophyllum*; **Cucurbitaceae**, *Cucurbita*; **Dioscoreaceae**, *Dioscorea*; **Euphorbiaceae**, *Carissa*, *Codiaeum*, *Croton*, *Manihot*; **Fabaceae**, *Cassia*; **Goodeniaceae**, *Scaevola*; **Hydrangeaceae**, *Hydrangea*; **Lauraceae**, *Persea*; **Liliaceae**, *Cordyline*; **Loranthaceae**, *Loranthus*; **Lythraceae**, *Lagerstroemia*; **Malvaceae**, *Hibiscus*; **Meliaceae**, *Melia*; **Moraceae**, *Ficus*; **Myrsinaceae**, *Ardisia*; **Myrtaceae**, *Eucalyptus*, *Eugenia*, *Psidium*; **Nyctaginaceae**, *Ceodes*; **Oleaceae**, *Jasminum*; **Orchidaceae**, *Broughtonia*, *Lissochilus*; **Pandanaceae**, *Pandanus*; **Pittosporaceae**, *Pittosporum*; **Podocarpaceae**, *Podocarpus*; **Polygonaceae**, *Coccoloba*, *Polygonum*; **Rubiaceae**, *Cinchona*, *Coffea*, *Gardenia*, *Ixora*; **Rutaceae**, *Aegle*, *Citrus*, *Clausena*, *Murraya*, *Poncirus*; **Sapindaceae**, *Euphoria*, *Litchi*; **Sapotaceae**, *Achras*, *Chrysophyllum*, *Manilkara*, *Pouteria*; **Solanaceae**, *Brunfelsia*; **Sterculiaceae**, *Theobroma*; **Theaceae**: *Camellia*; **Umbelliferae**, *Apium*; **Verbenaceae**: *Clerodendron*, *Lantana*, *Verbena*; **Zingiberaceae**, *Alpinia*, *Zingiber* (Ben-Dov, 2011).

Coccus viridis is usually parthenogenetic, ovoviviparous and multivoltine. It breeds continuously if environmental conditions are suitable. In Florida, U.S.A., females take 50–70 days to complete their development (Fredrick, 1943); and in Queensland, Australia, it has 3–4 generations per year (Smith, Beattie, & Broadley, 1997). Köhler

(1976) studied the life history in Cuba, observing males for the first time, at low frequency.

A large number of natural enemies have been recorded for *C. viridis* including at least 78 taxa of Chalcidoidea, mostly in the Aphelinidae and Encyrtidae (Universal Chalcidoidea Database, www.nhm.ac.uk), five species of Coccinellidae and several species of fungi (Ben-Dov, 2011).

GEOGRAPHICAL DISTRIBUTION

Coccus viridis is native to the Neotropics and is reported to be originally from Brazil (Dekle, 2009). It has spread widely in tropical and subtropical regions due to anthropogenic activities.

Nearctic: Mexico; U.S.A. **Neotropical:** Bermuda; Bolivia; Brazil; Colombia; Costa Rica; Cuba; Dominican Republic; El Salvador; French Guiana; Galapagos Islands; Guadeloupe; Guatemala; Guyana; Haiti; Honduras; Jamaica; Martinique; Panama; Peru; Puerto Rico & Vieques Island; Saint Croix; Trinidad and Tobago; U.S. Virgin Islands; Venezuela. **Afrotropical:** Agalega Islands; Angola; Cameroon; Cape Verde; Comoros; Ivory Coast; Eritrea; Ethiopia; Ghana; Guinea; Kenya; Madagascar; Mauritius; Nigeria; Reunion; Sao Tome and Principe; Seychelles; Sierra Leone; South Africa; Tanzania; Uganda; Yemen; Zaire; Zambia; Zanzibar. **Palaearctic:** Egypt; Madeira Islands; U.K. (on indoor plantings, reported here). **Asia:** Burma; China; Hong Kong; India; Indonesia; Kampuchea; Philippines; Sri Lanka; Taiwan; Thailand; Vietnam. **Pacific Region:** Australia; Bonin Islands; Cook Islands; Fiji; French Polynesia; Guam; Hawaiian Islands; Kiribati; Nauru; New Caledonia; Northern Mariana Islands; Palau; Papua New Guinea; Solomon Islands; Tonga; Tuvalu; Vanuatu; Wallis and Futuna Islands; Western Samoa (Ben-Dov, 2011).

Coccus viridis has been recorded from *Ixora* in a glasshouse in the Netherlands (Jansen, 1995), but no details were provided and its status in the country is unclear. It has been found in England on a sapodilla plant imported directly from Italy, although it has not been recorded from that country (Longo *et al.*, 1995).

ECONOMIC IMPORTANCE

Coccus viridis is a serious pest of coffee, citrus and several other crops in tropical and subtropical regions. It is a major pest of citrus in Bolivia, but is a less significant citrus pest in other South American and South East Asian countries (Talhouk, 1975).

Coccus viridis has proved to be a damaging pest of ornamental plants at The Eden Project and this is undoubtedly linked with the high population levels of the ant *T. albipes*. Bess (1958) demonstrated experimentally that the removal of *T. albipes* from coffee branches and orange (*Citrus sinensis* (L.) Osbeck) plants infested with *C. viridis* in Sri Lanka resulted in a rapid and severe decline in numbers, and eventual disappearance of the scale over a period of about four months, while ant-attended scale colonies continued to thrive. This was largely due to the foliage becoming covered in sticky honeydew which trapped the scales, and the ant-free foliage becoming covered in sooty moulds growing on the honeydew and smothering the scales.

CONCLUSION

Coccus viridis is an invasive pest that has spread widely in tropical and subtropical regions. It has also been found on indoor plantings in botanical collections in

temperate regions. Being broadly polyphagous on perennial plants and parthenogenetic facilitates its naturalization in new areas after accidental transport on host plant material. It appears to have been breeding in the Humid Tropic Biome at The Eden Project continuously for several years (since at least 2008 when coccid abundance was first noticed to be increasing) and is likely to persist for as long as suitable host plants are available. Although *C. viridis* is likely to be present at The Eden Project for the foreseeable future there is no obvious pathway from the botanical garden for it to be disseminated (infested plants will not be moved) and it is not likely to be able to survive, or at least overwinter, outdoors in Britain.

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SHORT COMMUNICATIONS

***Conops vesicularis* L. (Diptera: Conopidae) utilising a profusely flowering spindle bush.** – An observation of *Conops vesicularis* utilising a flowering spindle bush is presented. *Conops vesicularis* is a nationally scarce species of conopid fly (Falk, 1991) and this is the first record for VC20, Hertfordshire (M. Aldridge, 2012, pers. comm). On 29.v.2012 and 30.v.2012, a large number of insects was observed congregating on a flowering spindle bush near the car park at Broxbourne Wood NNR taking advantage of the availability of a rich source of pollen and nectar during fine weather. On both days the temperature reached 22°C with sunny spells and high humidity by the afternoon. Broxbourne Wood NNR is an ancient woodland of 237 ha owned by Hertfordshire County Council. It is situated on fairly acid soils with only limited availability of nectar rich flowering plants and shrubs suitable for attracting large numbers of insects during the early summer months. The site is part of a Special Area of Conservation (SAC) and also has SSSI designation, principally because the dominant tree species, hornbeam *Carpinus betulus*, is a species on the northern edge of its UK geographical range in Hertfordshire (James, 2009). Other Diptera species noted visiting the spindle flowers were *Bombylius major* L. (Dip.: Bombyliidae), *Cheilosia* spp., *Criorhina berberina* (F.), *Dasysyrphus tricinctus* (Fallén), *Dasysyrphus venustus* (Meigen), *Epistrophe eligans* (Harris), *Episyrphus balteatus* (De Geer), *Eristalis tenax* (L.), *Leucozona lucorum* (L.), *Myathropa florea* (L.), *Rhingia campestris* Meigen (Dip.: Syrphidae), *Phasia hemiptera* (F.) and *Tachina fera* (L.) (Dip.: Tachinidae). Several species of aculeate hymenoptera were also noted, these were *Andrena nitida* (Müller) (Hym.: Andrenidae), *Apis mellifera* L., *Bombus hypnorum* (L.), *Bombus pascuorum* (Scopoli), *Bombus pratorum* (L.) (Hym.: Apidae), *Nomada leucophthalma* (Kirby) (Hym.: Apidae), and *Vespa crabro* L. (Hym.: Apidae).

Two adult *C. vesicularis* were observed flying around the spindle bush on 29.v.2012 and 30.v.2012. They landed occasionally, and this was almost always in the uppermost branches, however, one eventually alighted on the lower branches allowing photography (Plate 16, Fig. 2). Conopid flies are mainly parasites of aculeate bees and wasps (Clements, 1997), *C. vesicularis* parasitizes *Bombus muscorum* (L.) (Smith, 1969), but it has also been suggested that an alternative host may be the hornet, *V. crabro*, especially in woodland habitat unsuitable for *B. muscorum* (Falk, 1991). Two queen hornets were occasional visitors to the spindle flowers, sometimes appearing to seek out nectar and on other visits clearly hunting for prey. The arrival of a hornet at the bush was quickly realised by *C. vesicularis*, as one or both individuals immediately flew in close attendance with the hornet as though waiting for an ideal opportunity to make an attack, although no successful attack was

witnessed. As each hornet flew from flower to flower a *Conops* would hover about 20 cm to the rear as though watching and waiting for an opportunity. This behaviour suggests that the hornet may be an alternative host for *C. vesicularis* particularly as they showed no interest in *Bombus* species that were visiting the flowers.

Conopid species tend to be found in situations where there is a high concentration of available pollen and nectar for their host aculeate species (Falk, 1991; Clements, 1997). For example, my own data show that the flowers of devil's-bit scabious (*Succisa pratensis*), during late summer along rides at Tiddesley Wood, Worcestershire, (SO930455), attract many insect species, including conopids waiting on the flowers for their intended host victims. *Conops quadrifasciatus* De Geer is particularly common here, although the less common *Conops ceriaeformis* Meigen was collected on 18.viii.2002 and 1.ix.2002. Flowers of wood spurge (*Euphorbia amygdaloides*), are favoured by *Myopa buccata* (L.), (Wyre Forest, Shropshire, SO7077, several dates between 2000 and 2008) whereas common knapweed, (*Centaurea nigra*), is favoured by *Physocephala rufipes* (F.), (Drakes Broughton, Worcestershire, SO919483, many dates between 2000 and 2009). *Conops flavipes* L. and *Conops strigatus* Wiedemann in Meigen are found more frequently on flowers of ragwort (*Senecio jacobaea*), especially in Wyre Forest, Shropshire, SO7077, (several dates between 2000 and 2008), by contrast *Sicus ferrugineus* (L.) shows a distinct preference for the flowers and foliage of bramble (*Rubus* spp.).

Spindle is a fairly common shrub of hedgerows and woodland edges; it is most often found on calcareous soils and is known for its value to insects, particularly Diptera, with its nectar-rich flowers, (Proctor & Yeo, 1973), however, it may be overlooked by entomologists when it is flowering in shaded situations. The spindle bush near the car-park at Broxbourne Wood was growing in an open area and flowering profusely. It is recommended that at sites where nectar sources for foraging insects are limited, and spindle is present, the bushes should be managed in such a way that some are open grown in order to provide valuable nectar and pollen sources for visiting insects. – KEVIN A. MCGEE, 9, Woodrush Heath, The Rock, Telford, Shropshire. TF3 5DL. (email: kevinmcgeeandrena@live.co.uk).

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The use of a domestic vacuum cleaner as a suction sampler. – Since the spring of 2010, I have been using a cordless, handheld vacuum cleaner for suction sampling, as an alternative to the conventional, heavy, bulky, petrol-driven devices commonly used for this work. My first appliance, a Halfords car vacuum cleaner (Ryan, 2011), proved very successful as a small, lightweight unit that could be carried in my rucksack wherever I went and deployed whenever an opportunity arose. The device's

only drawback was its short battery life, which became rather limiting as my interest in suction sampling grew. Consequently, at the beginning of the current year I switched to a new device, a Vax LiFE handheld vacuum cleaner, which is more powerful than the Halfords model (18 rather than 12 volts), and lasts two to three times longer on a single charge. More importantly, the Vax LiFE runs off a replaceable lithium ion battery, which can be changed in the field, allowing sustained use for a period limited only by the number of batteries to hand.

This new tool has proved to be much more effective in my ongoing study of the Hemiptera-Heteroptera associated with mosses, collecting the lacebugs (Tingidae) *Acalypta parvula* (Fallén), *A. carinata* (Panzer), *Campylosteira verna* (Fallén) and *Agramma laeta* (Fallén), the minute bugs (Microphysidae) *Myrmedobia exilis* (Fallén) and the notable *M. coleoptrata* (Fallén), and miscellaneous groundbugs (Lygaeidae). I have also applied the device to other pabula, taking the Red Data Book capsid bug *Chlamydatus evanescens* (Boheman) (Miridae), its congener *C. saltitans* (Fallén) and the notable groundbug *Megalonotus praetextatus* (Herrich-Schaeffer) (Lygaeidae) on stonecrop, *Sedum* spp. (Crassulaceae), and the notable groundbug *Heterogaster artemisiae* Schilling (Lygaeidae) on wild thyme, *Thymus polytrichus* Kerner ex Borbas (Lamiaceae). Details of this work will be published in later articles.

The Vax LiFE is more expensive than the Halfords model, and currently has to be bought in combination with an upright vacuum cleaner that runs off the same battery. Vax are currently selling this ‘unplugged Multipack’ (model BF90-LF-B) for £130 on their website (<http://www.vax.co.uk/life-unplugged-multipack-upright>, as of 18 July 2012), and the spare batteries are priced at £50 each. However, I recently picked up a second Multipack on eBay (<http://www.ebay.co.uk>) for £87, so I now have a second battery and a spare suction sampler . . . and another upright vacuum cleaner. The two batteries allow continuous collecting for one hour, and they fully recharge from flat in less than two hours (compared with overnight for the Halfords model), so the batteries used in the morning could be used again in the afternoon. The Vax LiFE has a six-year guarantee, although I am uncertain whether what I am doing with it would be classified as ‘reasonable use’, should I ever need to make a claim. It is larger and heavier than the Halfords model, but can still be carried easily in my rucksack. It is more prone to blockage, but this is easily remedied by covering the nozzle with 10mm mesh garden netting (Homebase, item number 115594), secured with elastic bands. No other modification is necessary for use in the field.

I was initially hesitant about acquiring the Vax LiFE, fearing that the vortex caused by this particular device would tear apart the sampled bugs. However, I have not seen very many damaged insects, except in damp conditions, where even sweeping can make a mess of specimens. With several species, including the seemingly delicate *C. evanescens*, I have successfully reared collected nymphs through to adults, and collected adults have laid eggs from which I have obtained nymphs, so my fears about damaged specimens appear to be unfounded, and I have had no urge to return to my Halfords device.

For the professional entomologist, the petrol-driven suction samplers may well remain the devices of choice. However, for amateur use, the Vax LiFE handheld vacuum cleaner is a most effective and convenient tool, and I commend it to anyone who is tempted to add suction sampling to their technical armoury. – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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SOCIETY NEWS

Formal Opening of the Graham and Helen Howarth Room 22nd April 2012

When the Pelham Clinton Buildings, the Society's headquarters building at Dinton Pastures, was built in 1992, part of the arrangement with Wokingham District Council was that a room be provided for the exclusive use of the Country Park. Over the last twenty years this room has been used by the Park as a display area and for other purposes. We became aware that the Country Park was perhaps not utilising the room fully at the same time that a need for more space



Graham Howarth prepares to cut the ribbon.

became obvious to us, and we were able to negotiate the purchase of the room from the Council.

We were helped in making the purchase by a generous gift from Graham Howarth, the longest serving member of the Society (although not quite the oldest member) and completed our purchase in early 2011. We were faced with the task of integrating it into our existing space and this necessitated making modifications to the layout of the library so that a door could be cut between it and the new space. Security had to be modified, and decoration, furnishing and equipping carried out.

The opportunity was taken to undertake essential work on the building at the same time and this included renewing the air-conditioning system which ensures the collections and books are kept in the best ambient conditions, and carrying out other electrical work. Old wooden cupboards in the library have been replaced with more secure modern units which occupy less space; at the same time more library shelving has been provided.

It is felt that the Howarth Room will bring many benefits and enhance the facility overall. Previously it was necessary to hold part of our workshops in hired rooms, which apart from the cost, entailed participants moving location during the course of a workshop. Now everything can be done in-house which is a big advantage. In addition to the use of the room as a lecture hall and for internal meetings where previously we needed to hire rooms, it provides some storage capacity, and as a result is enabling more space to be found in both the collections room and library. The collection of historical entomological equipment and ephemera left to us by the late Malcolm Simpson will be displayed here. Our freezer, which is used to prevent infestations of the collection by pests, is also housed in the new room. In addition, we now have essential wider access to the whole building.

None of these recent improvements would have been possible were it not for the generous support of our members. Many members gave their time to help with the renovations and decorations and for this the Society is most grateful. To fund the project financial support again came from many of our members, two of whom we would especially like to thank. The late Andy Callow left us a generous bequest. He became a member of the Society in 1963 and served on Council and as an officer of the Society for many years. We extend our thanks to his family. Graham Howarth has made a substantial donation to the Society for which we also give grateful thanks.

Now in his ninety seventh year, Graham Howarth is the longest serving member of the Society having joined in 1931 at the age of fifteen. He was President sixty years ago! Graham is still active in Society affairs and remains a member of the Editorial Panel. With the exception of his years in the Army Medical Corps during the Second World War he spent his whole career at the Natural History Museum where he specialised in butterflies, especially oriental lycaenids. His wartime experiences are detailed in our then journal as 'Prison Camp Entomology in the Far East'. He will be well known to many for *South's British Butterflies*, the standard text book on the subject, which was published in 1973. His late wife, Helen, also took a keen interest in the Society's affairs, serving for a spell on Council, introducing, and for many years overseeing the catering at the twice monthly meetings which were a feature of the Society until comparatively recent times. It is thus appropriate that this new Society facility should be named in honour of them both.

More than sixty members and friends attended at Dinton Pastures on Sunday 22 April to watch Graham cut a ribbon to mark the opening of the room and make a



Members and guests outside the Graham and Helen Howarth Room.

spirited speech. Amongst the guests we were pleased to welcome Professor Stuart Reynolds from the Royal Entomological Society, Dafydd Lewis representing the Amateur Entomologists Society, Maurice Avent representing Butterfly Conservation and Mark Morris, representing Wokingham Council. Amongst our members who were present were representatives of Buglife, and our associated societies Dipterists Forum, the Bees, Wasps and Ants Recording Scheme and the British Myriapod and Isopod Group. The party then moved into the new room just before a sharp hail storm transformed the area with piles of ice, and we were able to enjoy a buffet lunch organised by our Vice-President Dr Glenda Orledge and her team of helpers. There was then plenty of time for a tour of the whole building including the new library facilities, or to reminisce with Graham. The accompanying photographs were taken by Alec Harmer.

TONY PICKLES

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Joint BENHS/LNHS Meeting, 11 September 2012, The Natural History Museum

The 2012 annual joint meeting between the British Entomological & Natural History Society and London Natural History Society was hosted by the Society in the spacious and comfortable surroundings of the Flett Theatre in The Natural History Museum. Tony Pickles (BENHS President) chaired the meeting and called for exhibits to begin proceedings. Roger Hawkins announced the publication of the latest volume in the Surrey Wildlife Trust series of atlases, *The Smaller Moths of Surrey* by Bob Palmer, Jim Porter & Graham A. Collins at a price of £28 per copy (excluding postage) for a hardback of 543 pages with 32 colour plates. Andrew Halstead brought along a jar containing two half-grown larvae of the Goat Moth, *Cossus cossus* (L.) sent to the exhibitor from the trunk of mature oak tree growing in Lightwater, Surrey (SU 9261). The larvae were found by the tree's owner when bark at the base of the trunk was removed, where fermenting sap was oozing out. There were said to be dozens of larvae present. While the larvae can take several years to complete their development in wood, in captivity their growth can be accelerated considerably by feeding them with vegetable food such as carrot or apple

Tony Pickles then gave a short presentation outlining the history and current activities of the BENHS with photographs including well-known past members and recent field meetings, workshops and regional meetings. Those who are not currently members were warmly invited to consider joining the Society.

The President then welcomed and introduced Dr Phil Sterling (Dorset) to give the Brad Ashby Memorial Lecture *Small is the new Big: the future for micro-moth recording in Britain* (Fig. 1). Phil is the lead editor of the new *Field Guide to the*

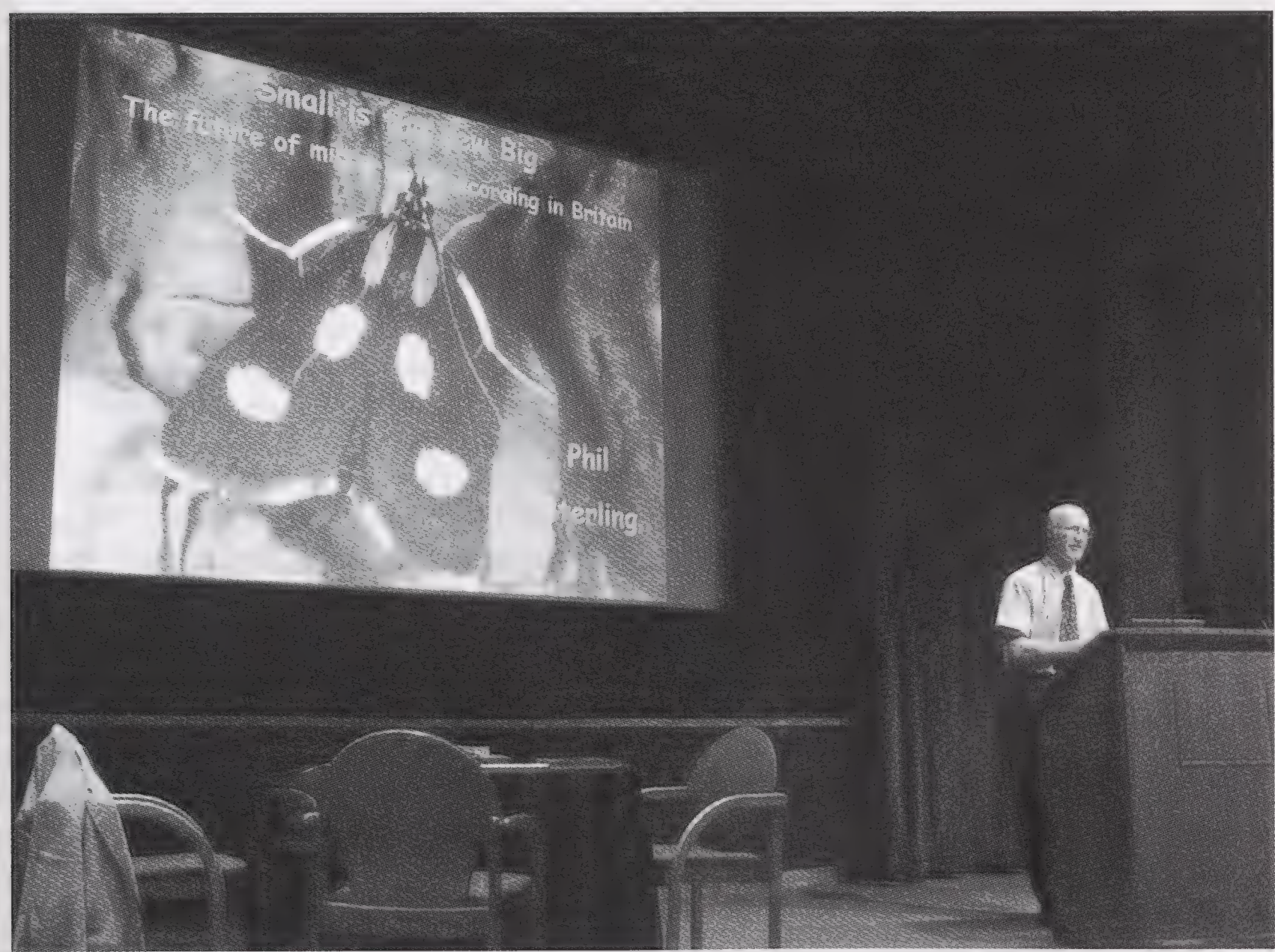


Fig. 1. Dr Phil Sterling presenting the Brad Ashby Memorial Lecture at The Natural History Museum, 2012.

Micro-moths of Great Britain and Ireland published in May 2012 by British Wildlife Publishing. This aims to introduce many more entomologists and naturalists to the fascinating world of these typically tiny moths by including in a single volume information about all the families of British micro-moths, with keys to the families, illustrations and photographs of many adults and early stages and introductions to such topics as making slide preparations of genitalia (necessary for the accurate identification of many species).

Dr Sterling gave an account of his first steps in finding and studying micros, in a family where his father, Dougie, and brother, Mark were also enthusiasts and very active in this subject. He gave diverse examples of the extraordinary behaviour and life histories of different species, showing some of the range of biologies present and what can yet be discovered by diligent fieldwork. Phil paid warm tributes to Mark Parsons and the team of contributors to the text, who together delivered the final text on time in Spring 2012, as well as to the meticulous artwork by Richard Lewington that is such a notable feature of the book. He discussed the balance of the book in terms of the relative number of pages devoted to different families and genera, based on a range of criteria including the example of the relatively generous page allocation for Psychidae based on their fascinating biology! A summary of the specific topics of praise and criticism that have been raised so far was presented and discussed, with some points to be addressed in a second edition, which may not be so far away given how quickly the first edition has been selling.

After questions and comments from the audience, during which it was clear that those who spoke were eagerly putting the book to good use and seeing others do so as well, Tony Pickles thanked Phil Sterling for his excellent presentation, Alessandro Giusti (NHM Lepidoptera Section) who had done the preparation and organisation for the event within the Museum and Ian McLean for arranging the meeting for BENHS.

IAN MCLEAN

New members of the Society

Now that we no longer hold formal indoor meetings of the Society, the election of members to the Society is undertaken by Council at committee meetings. The following new members have joined the Society during the past year:

M. J. Feeny-Brown of Peasmarsh, East Sussex; A. G. Goodall of Southampton; P. Hall of Great Missenden; D. Howdon of Greenford, Middlesex; A. M. W. King of Chorleywood, Herts; Ms S. Luker of Penzance; Dr R. P. Ryan of Oxford; A. Simpson of Manchester; G. M. Tordoff of Llandeff, Cardiff; C. A. Barnes of Lincoln; R. D. Edmunds of Downham Market, Norfolk; J. D. Glasgow of Winchester; J. B. Higgott of Ipswich; Mrs H. R. Kirk of Sandtoft, S. Yorks; C. B. D. Lucas of Beccles; A. F. Mylward of Weymouth; K. A. Naylor of Dalbeattie, Dumfries & Galloway; Dr C. D. Parkinson of Basildon; G. Rostron of Hyde, Cheshire; R. Day of King's Lynn; K. C. Fowler of Telford; Natalie Dale-Skey of London; Dr Catherine Burton of Horley; N. D. Cane-Honeysett of Telford; Dr G. H. J. Meredith of Cheltenham; M. P. Wainhouse of Farnborough, Hants; S. M. Teale of Newhaven; R. Vinkenoog of Prudhoe, Northumberland; Jennifer Green of Grantham; R. A. Wain of Ripley, Derbyshire; C. F. Dewhurst of Cheltenham; Dr N. W. Owens of Weybourne, Norfolk; Mr P. A. Vernon of Colyford, Devon; Mrs S. J. Patton of Fernhurst, West Sussex.

THE LAST FORTY YEARS OF THE SOCIETY

TONY PICKLES

2a Park Avenue, Lymington, Hampshire, SO41 9GX
Apickles1@aol.com

2012 sees the one hundred and fortieth anniversary of the foundation of our Society as the South London Entomological and Natural History Society. *The New Aurelians* was written by Dr. Michael James to celebrate our Centenary and no doubt a further detailed history will appear when we make a hundred and fifty. If there are any members who have not read *The New Aurelians*, by the way, I must urge you to do so, it is a stirring tale of Victorian and Edwardian pluck! However, because there have been such changes in both society, and our Society over the last forty years I thought it might be an appropriate time to at least summarise them.

In 1972 the Society was ensconced at the Alpine Club in London's South Audley Street. There were regular meetings for members every few weeks, where, after tea and biscuits, there would be exhibits to start the evening. Members would present their interesting exhibits to the President, say a few words about them and then they would be passed round for examination by everyone present. A guest speaker would address us on a chosen topic, or occasionally there would be a members' slide evening, and then discussion of the exhibits or remarks following on from the talk. There would be an opportunity to visit the collections and library, which were in a crowded room down the stairs from the meeting room. After the meeting finished it was a few yards to the 'Audley' and continued discussion over a pint of ale.

Things are very different now. We have our own specially constructed headquarters building at Wokingham, the Pelham-Clinton Building, with much larger environmentally controlled collections room and library, as well as a third room acquired recently where we can hold talks and meetings. We have open days throughout the year where members and guests can spend nearly a whole day working on the collections, using our microscopes, or in the library. Our collections are the most accessed in the Country thanks to our relaxed regime. We have a comprehensive programme of workshops, many, but not all held at the Pelham Clinton Building where specialists help enthusiasts to grapple with new groups of insects, or improve their skills. We run Regional meetings in towns and cities throughout the country with only the annual joint meeting with the London Natural History Society being in London, and our links with Central London are nearly severed.

In 1972 our Balance Sheet disclosed that the Society had some £8,000 of assets and now it discloses some £400,000. Then we had 600 members, now it is 800.

How and why did this come about? Teddy Pelham-Clinton, Duke of Newcastle and renowned microlepidopterist left us a most handsome bequest in 1988, and we had already benefitted from the generous wills of Cyril Hammond and Peter Crow. Necessity was the mother of invention, and when, in 1989 we were told by the Alpine Club that they were moving and therefore we must move too, the brave decision was taken to build our own facility. Frances Murphy, our Honorary Secretary and then President, together with other members and members of Council, first sought the agreement of the membership, and after an overwhelming vote to proceed, secured a peppercorn lease of land at Dinton Pastures Country Park. This location was recommended to us by our late member Bill Parker, following discussion with the then Country Park manager Jill Butler. The decision to build was pushed through in the following year under Colin Plant in tense Council meetings, and in 1991 we

started to build. Our headquarters were completed in August 1992 and we were honoured when the late Professor Sir Richard Southwood officiated at the opening ceremony on 27 June 1993. The Society was changed forever by the generosity with time, money and enthusiasm demonstrated over these few short years.

Huge debts of gratitude are due to many members of the Society who devoted countless hours to supervising the construction and then equipping the building. The collections and library had to be stored and then moved and rearranged. In the *New Aurelians* the many moves of the Society are detailed, now we had stability for the next seventy years and beyond. Our Journal for October 1992 recounts much of the story of those times and features pictures of Peter Chandler and Stephen Miles looking remarkably young.

It was in 1968 that the change of name from 'South London' to 'British' had finally come about and now we had the opportunity to truly embrace that larger ambition. Our field meetings, always a strong point of the Society, were held further afield. We visited Wales and Scotland as well as sites all over England in addition to our traditional home county localities. The Society has ventured abroad on several occasions in the last forty years. We have had exchange visits with French Entomological Societies, two expeditions to Belize and one to Slovenia. All were declared a success and further such projects are under consideration.

The pattern of indoor meetings had already started to change. No longer were our meetings attracting the sort of numbers who had attended at South Audley Street. Council agonised over the content, we reduced the frequency, but still attendances dropped. As Andrew Halstead said in his Presidential address, the talks we arranged were not getting the audiences they deserved. Changes in lifestyle and working practices meant that people were just less inclined to attend in Central London during the week. The meetings were held in the Royal Entomological Society's premises adjacent to the Natural History Museum and when the RES decided to sell up and move out of town we were once again pushed into a decision. Council decided to try taking the Society to the Country and the Regional Meetings were born. These meetings feature a full day of events held on a Saturday with often a Field Meeting the next day. There are a varied range of speakers during the day and the chance to meet members who would not usually travel to London. So far, this new departure has been popular and we are very happy with the attendances, which have been as high as sixty members and friends; we seem to be meeting a need.

The Society has been interested and involved with conservation throughout its history and during this period has been involved in several initiatives. We have supported Invertebrate Link (formerly JCCBI) since inception. Some of our members were key to the development of 'A Code for Insect Collecting' published by JCCBI and printed in our Journal as well as its other initiatives (Invertebrate Link, 2002). Stephen Miles was responsible for the formation of our Conservation Working Group and largely for the successful Heathland Flies project. The Society was approached by certain members to see if we could help with the technicalities of setting up a charity, The Invertebrate Conservation Trust, or Buglife as it became. As we had become a registered charity ourselves during this period we were glad to assist; Buglife, of which we remain a supporter, has now been going for ten years and is doing important work for the conservation of Invertebrates in Great Britain, and now in Europe.

There has been a massive shift in the way insects, especially Lepidoptera, are studied over this period. Some would think not always for the better. Forty years ago it was rare to find someone with an interest who did not collect specimens. Now there are very many who contribute to the burgeoning number of recording schemes and local groups who rely on digital photographs and sometimes are even reluctant to

take occasional voucher specimens. These days quite a few of our members fall into this category and we are happy to help with identification issues and to support these schemes.

Since the Society became a Registered Charity it has become affiliated with other entomological organisations, Dipterists Forum, the Bees, Wasps and Ants Recording Schemes and the British Myriapod and Isopod Group. The furtherance of our relationship with these bodies and possibly others is under active consideration by Council. We have also been able to offer our members free insurance cover as required by many landowners before visiting their sites.

Professor Erich Hering was the first to endow a research grant to the Society which we administer, but because of the somewhat restrictive conditions of grants under that fund (priority being given to the study of leafminers), we took the decision to introduce a grant scheme of our own, using money generously bequeathed by Maitland Emmet. Through this fund, the Maitland Emmet BENHS Research Fund we offer grants to both members and non-members of the BENHS, for support for research on insects and spiders with reference to the British Fauna, and with an emphasis on the assistance of field work on insects with relevance to their conservation as well as work leading to the production of identification guides and distribution lists. During the existence of the fund, and in a small way, we have helped many original entomological projects to reach fruition, and the results to be published.

Over these forty years the rate of change in technology has been unprecedented. We have responded not only with hi-tech nets and motorised suction pumps, but with a website where information about our activities can always be found, and the increasing use of emails for contact between members. Preparation of papers and books for publication has changed beyond recognition and not only has the quality of presentation of our Journal improved significantly but we have been able to publish several new books. *British Hoverflies* (Stubbs & Falk, 1983; 2nd edition 2002) and *British Soldierflies and their Allies* (Stubbs & Drake, 2001) have been and remain extremely popular, and our latest publication, *British Plume Moths* (Hart, 2011) is set to revolutionise the study of this group of moths. New editions of the two works on Diptera are being published this autumn. All these publications have been produced by our members on a purely voluntary basis and have helped to spread entomological knowledge throughout our community.

With all this going on, the traditional core of the Society has not been forgotten and there have been significant increases in the library facilities. We have acquired by donation and bequest many desirable books, as well as pursuing a policy of purchasing new titles the library committee selects. The collections have grown steadily too, with many significant additions. I should mention Scandinavian Lepidoptera donated by Stig Torstenius and European moths donated by Barry Goater, some hundred drawers in total, but others would pick out the many additions to their specialist group.

The annual exhibition was held at the Chelsea Town Hall at the beginning of this period and members attending had the opportunity of watching the emergence of Punk culture in the Kings Road during a break for lunch at the Six Bells. We moved to Imperial College in the early eighties and the exhibition has been a fixture there ever since. It remains of paramount importance to the Society, and to many of our members. When we first held the Exhibition at Imperial, parking was readily available and comparatively inexpensive. The dinner was held there as well, so everything was very convenient. The dinner was held on Friday evening before the Exhibition and attendees were full of anticipation of the good things to come the following day. It was a popular event, one hundred and eighty six attended the Centenary Dinner. Now only

about thirty five stalwarts stay after the Exhibition for our Dinner. Times have changed, and in the last few years catering costs have become so high that we have been forced to move to a nearby hotel. Parking has decreased in amount and increased in cost, and because of ever-rising prices for the exhibition room, 2012 will be the last exhibition held at Imperial College. In 2013 we will be at Kempton Park.

On 27 July 1972 a meeting was held to discuss the next one hundred years of the Society. It is interesting to read the report. What I take from the many predictions raised, is the view expressed by Ken Evans and Russell Bretherton that the membership is key to the character of the Society, and of Ray Uffen that the all-pervading friendly atmosphere overlaying a common interest was the 'something out of the ordinary' which was so attractive.

So, forty years of change; but the one thing that remains unchanged over that period, and I suspect over the whole life of the Society, is our members' enthusiasm and willingness to welcome novices and newcomers with that same spirit of friendliness and openness.

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Fig. 1. Larval case of *Coleophora discordella* on an apical leaflet of bird's-foot trefoil.

Coleophora discordella Project

Coleophora discordella Zeller is a widespread species in Britain and is most easily found, as a late-instar case-bearing larva, feeding on bird's-foot trefoil *Lotus corniculatus* in early summer. During May 2013, I will be collecting cases to measure the extent of parasitism and the species involved. I would be grateful if members could also send me larval cases (see Fig.1). Samples should be sent to the address below. The little mint tins (e.g. as sold by Costa Coffee) are ideal containers for posting specimens. The exact location and date of collection should be included.

All emerging moths will be released but the parasitoids will be kept for identification. I hope to publish the results and will credit everyone who sends specimens. Please email me immediately if you think you can help. – DEREK PARKINSON, 11 Crow Tree Close, Baildon, Shipley, West Yorkshire, BD17 6JH. Email: derekparkinson@blueyonder.co.uk

THE MAITLAND EMMET BENHS RESEARCH FUND

In 2001 the family of the late Lt. Col. Maitland Emmet, a distinguished amateur microlepidopterist, made a generous donation to the Society's Research Fund in his memory. As a result the Society has renamed its Research Fund the Maitland Emmet BENHS Research Fund. The Society is very grateful to the Emmet family for their generosity.

The Society invites applications for grants, from the Maitland Emmet Research Fund, to be awarded in February 2013. Awards are open to both members and non-members of the BENHS and will be made to support research on non-marine arthropods, with reference to the British fauna, and with preference given to insects, arachnids, myriapods and isopods. Grants will be given for:

- (a) the assistance of fieldwork on non-marine arthropods with relevance to their conservation,
- (b) work leading to the production of identification guides and distribution lists, but not the cost of publishing such items.

Travel to examine museum collections and to consult taxonomic specialists would be included. The work and travel is not limited to the British Isles but must have a demonstrable relevance to the British arthropod fauna. Individual grants are unlikely to exceed £500.

Preference will be given to work with a clear final objective (e.g., leading to publication or the production of a habitat management plan). Work on leaf miners and gall forming insects should be submitted to the Society's Professor Hering Memorial Research Fund.

Applicants should send seven copies, if possible, of their plan of work, the precise objectives, the amount for which an award is requested and a brief statement outlining their experience in this area of work, to **Dr J. Muggleton, 17 Chantry Road, Wilton, Salisbury, Wiltshire SP2 0LT**, as soon as possible and not later than 31 January 2013. Further information may be obtained from the same address (email: jmuggleton@aol.com).

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

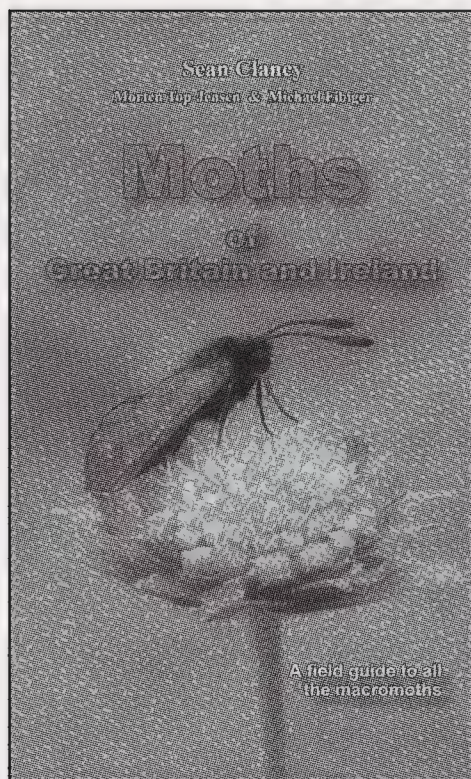
The British Entomological & Natural History Society announces that awards may be made from this Fund for the promotion of entomological research with particular emphasis on:

- (a) leaf-miners
- (b) Diptera, particularly Tephritidae and Agromyzidae
- (c) Lepidoptera, particularly Microlepidoptera
- (d) general entomology

in the above order of preference having regard to the suitability of applicants and the plan of work proposed.

Awards may be made to assist travelling and other expenses necessary for fieldwork, for the study of collections, for attendance at conferences, or, exceptionally, for the costs of publication of finished work. In total they are unlikely to exceed £1000 in the year 2013.

Applicants should preferably email, or send six copies, of a statement of their qualifications, of their plan of work, and of the precise objectives and amount for which an award is sought, to **Dr E. McAlister, Department of Entomology, The Natural History Museum, London SW7 5BD** (email: e.mcalister@nhm.ac.uk). The closing date for projects in 2013 is 31 January, 2013.



Moths of Great Britain & Ireland – A field guide to all macro moths by Sean Clancy, Morten Top-Jensen & Michael Fibiger. BugBook Publishing, 2012. Softback with plastic cover, 640pp, 1200 photographs and 60 colour plates. £54.00. ISBN 978-8-79935-124-4.

This new book is billed as a field guide to all the macromoths. It is impossible not to wonder why we need another such book, when we have just had new additions of both the *Colour Identification Guide to Moths of the British Isles* by Skinner and Wilson with its superb plates of set insects and Waring, Townsend and Lewington's *Field Guide to the Moths of Great Britain and Ireland* with its illustrations of moths in the resting position? We also have Chris Manley's *Photographic Guide to British Moths*. However, this new book is certainly different and does bring something fresh to the mix.

Essentially this work differs from the others in that each species description is accompanied by photographs of the living insect, sometimes several photographs, and sometimes larval illustrations as well, while there is also a section of sixty colour plates of set insects. There are also six plates of line drawings showing diagnostic differences between difficult species. The nomenclature has been brought up to date, and for the first time in a British work moves away from our parochial view and adopts the sequence used in the rest of Europe. The panel of authors are impressive, Sean Clancy is well known in English Lepidoptera circles, Morten Top-Jensen comes from Denmark with excellent credentials and the late Michael Fibiger was perhaps the best known European lepidopterist. Unfortunately his health did not allow him to take an active part in the completion of the work and it seems his influence was more inspirational than practical.

So far, so good, the ideas are inherently sound and in many ways the finished product lives up to its expectations. Most importantly, the construction of the book is intended to be practical and user friendly. The paper is resilient and the cover is waterproof. The idea of taking a book into the field to identify insects is alien to me; if you don't know what it is, the sensible option is to take it home. Nevertheless I carried the book around for a fortnight in the Alps to see how it coped, and have to say it did pretty well, although in damp conditions the waterproof cover was no help to the exposed parts as might be expected. I tried out the photographs of live moths against insects coming to light and found them a little confusing as the photographs are not to scale. I am not sure how useful this would be to a beginner who was not familiar with comparative sizes. An opportunity to include images of typical localities has also been missed. As a general rule, I am in favour of photographs over paintings every time, and many of the photographs are excellent. Some are inevitably less good and suffer from not being sharp, or being photographed against unsympathetic backgrounds, but on the whole they are very good and often show the moth from a variety of angles. The biggest problem with them however, seems to be that many specimens are European and do not necessarily exhibit the habitus of British insects. The colour plates are by Vladimir Kononenko, and are reproduced apparently at life size, with the exception of some smaller species shown magnified, and this allows for size comparison. Considering how well known Kononenko is, and the quality of his past work, I found these a little disappointing. I had the impression the moths were on the whole a little undersized, the plates too crowded

and the reproduction slightly muddy. I suppose crowding in the plates and other sections of the book is inevitable, when trying to include so much material into a book in a format of only 215mm by 130mm. Nevertheless this is a useful identification tool if one does not already have David Wilson's plates in Skinner. As the author points out, more features will always be shown by the set insect than photographs of living moths.

The text is clear and brief, focussing on the salient points. Sean Clancy's wide personal experience of the British fauna is evident in many places and there are references to behaviour in Europe where appropriate. I think the text would have benefitted, however, from following a more structured format as is usual in many such guides. Perhaps the best thing is the classification. It is a joy for someone who collects European moths to pick up a book and find the insects where I expect them to be. As stated in the introduction the nomenclature and hierarchy of the listed species generally comply with the latest developments and scientific work in the field. It is also gratifying to turn to a page and find the scientific name in bold print and placed first, and the vernacular name firmly subsidiary where it should be. There is, however, a problem with the names. At no place in the book is the full name of any insect given. Genus and species, but no author or date can be found. Not only is this unsound, but so much additional information is available to the reader from the full name. There is also no reference to Log Book numbers which seems an obvious omission in a book designed for recorders.

There are three indexes, one listing scientific names by genus, one by species and one by English names. I think this is an excellent arrangement and wish more books would follow it. There are several appendices listing imported and introduced species, erroneously listed species, Channel Islands species, RDB, Nationally Notable and UK BAP species and Species to be retained. This last appendix is especially useful as it shows species that, if suspected in Britain will require the retention of a voucher specimen, and it is good to see the need to take specimens emphasised, not only here, but in the introduction. Some of Sean's personal prejudices may have crept into his strictures against dealing in specimens, but why not, it's his book.

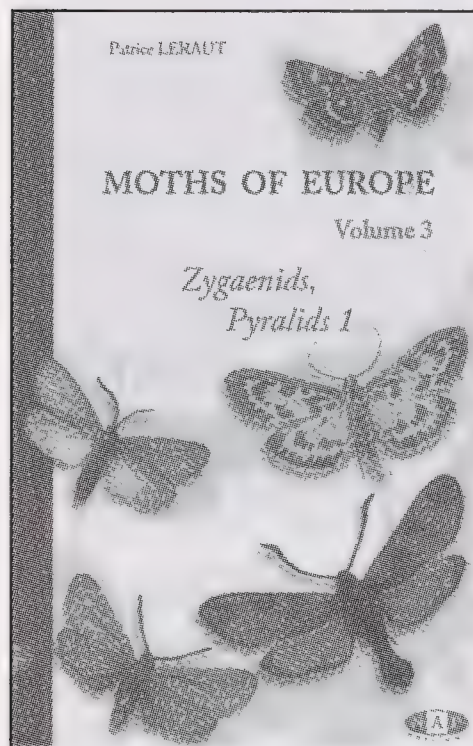
One area where the authors may be open to criticism is the dogmatic inclusion of controversial species where others may not have accepted them. To mention two such cases *Diachrysia stenochrysis* (Warren) is included as British, stating that its presence is confirmed, while many of the community of lepidopterists would consider that, as the majority of research has proved negative in this country, the matter is still open. *Euxoa eruta* (Hübner) is also listed as a confirmed resident, apparently widespread, without reference to the source of this information, when many would consider there are a few candidate specimens at best and the situation is far from resolved. In their treatment of *Euxoa nigrofusca* (Esper), here called *E. tritici* (L.) the authors also court controversy. There is nothing wrong with holding differing views, but it may be thought dangerous to include them as fact in a book which will mostly appeal to the army of moth trap recorders and beginners.

On the more positive side, there are a number of changed species names which are less controversial, but which I have not seen in other British books, *Hoplodrina octogenaria* (Goeze) instead of *H. alsines* (Brahm), *Luteohadena andalusica* (Staudinger) instead of *L. luteago* (D. & S.) and *Heliothis adaucta* Butler separated from *H. maritima* Graslin to name but three. This is encouraging, but without references the reader might have difficulty in understanding the reasons behind these name changes.

The curate's egg was mostly bad but good in parts. Here we have the opposite; many good things but tempered with areas which should have been better. Any book

which can get lepidopterists arguing about the problems of taxonomy in this country gets my vote, and this is a worthwhile addition to anyone's library, provided they already have the other field guides on their shelves. Enjoy the controversy, and then start rearranging your collection.

TONY PICKLES



Moths of Europe Volume 3. Zygaenids, Pyralids 1 and Brachodids. Text and photographs by Patrice Leraut, line drawings by Gilbert Hodebert. Translation by Nicholas Flay. N.A.P Editions, 2012. Hardback 599pp 112 colour plates. Hard cover 88 Euros. ISBN 978-2-913688-15-5.

This series on European Moths by Patrice Leraut has established itself as something a little different, a little quirky, and this third volume continues the pattern. It is not often that new species are described in a guide of this type but as in previous volumes the author has used this medium to describe new taxa; a new genus, seven new species and eight new subspecies. He is not afraid to court controversy as not everyone will agree with his views on taxonomy but he writes in an engaging, direct style and certainly gives food for thought. Nicholas Flay, who has

translated the text into English, has certainly done a good job. The book firstly covers the small family Brachodidae, part of the Sesioidea, with 15 European species of which many have diurnal males and of which there are no representatives in the British Isles. It then moves on to the Zygaenidae and finally to the Pyraloidea where the Crambidae are dealt with, the Pyralidae being left for a later volume.

The book follows the established pattern of a general introduction, an introduction to each family and subfamily and to some genera and a full species description, usually with a distribution map and with line drawings of genitalia and distinguishing features where thought necessary and a section of colour plates.

The introductory section has a delightfully old fashioned feel to it, reminiscent of Richard South, as it discusses the basic anatomy of moths, how to find and collect them and how to kill and mount them. One thing missing from South, however is the author's emphasis on the need to dissect many of the species dealt with here, in order to effect an accurate identification. The different types of habitats encountered in Europe are discussed and there are a few words on conservation. I quote from this section, 'As I have already remarked, exact knowledge of a great many species of our region covered most often cannot be gained without taking specimens' and 'Entomologists did not wait for the twenty first century before establishing a code of good practice founded on experience and common sense.'

Within the main part of the book, the species descriptions, there is a detailed description of both sexes followed by sections headed Variation, Closely related species, Biology, Flight time, Distribution and Status. Excellent line drawings by Gilbert Hodebert of genitalia or other features such as wing venation, spot patterns or details of antennae are included within the text wherever the author considers them helpful. It is very useful to have these features readily available when checking through material of such difficult groups as the Procridinae. For each species there is a small distribution map which should be read in conjunction with the Distribution section. The maps give a rough indication of the areas of Europe where species may occur but can be misleading without reading the text. As an example the text concerning *Pyrausta sanguinalis* (L.) refers to the Burren in County Clare but the

map shows the species in Northern Ireland. With the exception of the Burnets ('Languid Burnet' for *Zygaena sedi* (F.)) there are thankfully no English names; French vernacular names are given on which I will not comment.

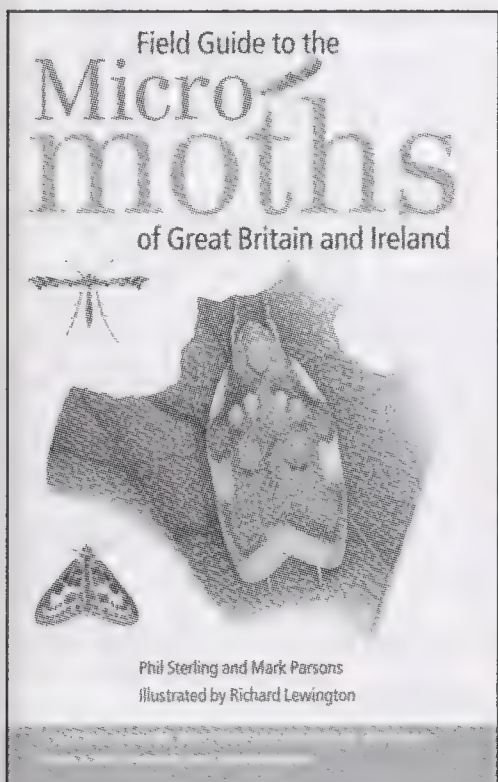
As in previous volumes in this series the author sometimes includes species 'for interest' from outside the area covered, often it seems because he likes them; an endearing habit. He raises occasional questions as if throwing down the gauntlet for others to research. Under *Uresiphita gilvata* (F.) he comments, 'Owing to the vast range of this species, it would be interesting to research whether or not several taxa might be mixed in under the same name.' He is not afraid to say that he does not know a species. For example under *Loxostege ephippialis* (Zetterstedt) he comments that *L. expansalis* (Eversmann), from European Russia is evidently related, 'but this author has no first-hand knowledge of that species.'

The colour plates are copious with many illustrations of critical species, fifteen of *Zygaena sarpedon* (Hübner), seven of *Sitochroa verticalis* (L.), but at times a little muddy. Sometimes one thinks that the specimens photographed could have been better selected but there is a vast amount of material here, over 2,300 photographs.

The index is clear and concise, listing by specific name and also listing genera.

The overall impression from reading this book is akin to spending an evening with a knowledgeable entomological friend, one may disagree with some of things he says but at the end of the day one has learned a lot and had a jolly good time. This book is highly recommended, not only for students of European moths but for those concerned only with the UK fauna. I await the next volume in the series impatiently.

TONY PICKLES



Field Guide to the Micromoths of Great Britain and Ireland by P. Sterling, M. Parsons and illustrated by R. Lewington. Published by British Wildlife Publishing, 2012. Softback £26.00, hardback £45.00. ISBN 9780956490216.

This book is described on the fly leaf as the most comprehensive field guide of its kind. Since it treats 1033 of over 1600 species of microlepidoptera that is not quite true; the Field Guide edited by A. M. Emmet (1988) dealt with all species known at that time, it is more comprehensive, but of course it was without illustrations whereas this book is lavishly illustrated.

The introductory chapters to this book are important reading, especially what is marked in bold type "It would be an unfortunate and unintended consequence if this

guide led to misidentification through readers trying to shoehorn every micro-moth found into species illustrated here." The authors recognise the dangers of a book with many illustrations and undoubtedly there will be many users who begin by looking at the pictures without first noting this caveat. This may be especially so with the large "difficult" genera like *Phyllonorycter* or *Coleophora* where the wing markings are similar and only one or two species are illustrated.

There is a readable introduction to the different families of microlepidoptera and their morphology, a common sense description with a minimum of technical terms. There is a good list of references to more technical tools and in the species descriptions the authors suggest works to be consulted in cases of uncertainty. There is also a useful list of websites where further images and information can be obtained.

A section on field work is well written but with priority being given to the study of adult moths. When mention is made of collection it is of “voucher specimens” and nowhere is it pointed out that the best means of identifying a specimen is by placing it side by side with a series of that species, whether in a private or museum collection.

This well intentioned emphasis on observation and implicit anti-collecting stance is tacitly assumed throughout the book. No one would doubt the merit of emphasising conservation, but an understanding of the populations of insects in contrast with vertebrates like birds would enlighten our understanding and remove inhibitions which can lead to incorrect identification.

The systematic section which occupies a large part of the book is well written considering the necessary limitation of space in a field guide. It is a pity the time of appearance of early stages is not included which would only have taken a small amount of space as in Emmet’s Field Guide where for example the date might be given as (months) 6–7. The photographs of early stages included here are extremely good and do something to rectify the imbalance described above. Each is accompanied by a small map with the vice-counties coloured green where the species has been recorded. These give an idea whether or not a species is likely to be recorded in a given area, but do not necessarily imply that it is resident there. The maps were carefully prepared by Mike Bailey from information held by John Langmaid, not Bob Heckford as stated in the introduction.

Scientific names are used for each species and these are in the sequence which accords with the most recent research, but that is not important for an identification guide. Where a species was given a vernacular name by Bradley it is included – and unfortunately precedes the scientific name. Such English names have usually been given only to very familiar species or to those of economic importance (some of which may be unfamiliar). It has become the practice in some quarters to use only the English name where such exists and this can lead to a failure of communication between users of a book like this and more experienced lepidopterists.

There are then 56 pages of illustrations of specimens in their natural resting position drawn by Richard Lewington. These are of the highest quality and since specimens photographed may have defects these are the best substitute I have seen.

The book concludes with a section on dissection techniques giving a well illustrated key to a few groups of species which are hard to separate by external characters. There is then a checklist giving all known British species marked by symbols denoting adventives etc. The index is unfortunately arranged so that the current genus name is required. This makes it much more difficult to use by anyone who knows micro-moths by their specific name which has been the norm. Generic placements have changed and many are likely to change again with increased taxonomic research.

The stated aim of this book is to enable many people who see micro-moths to identify them. The rich illustration should mean that it has achieved its objective, already it is much used and will result in more recording. The difficulty of identifying some groups combined with the limitations of space means that this cannot totally be realised.

Along with increased recording there is certainly going to be an increase in misidentifications but this cannot be held against the authors of this book who have done a great job. County recorders will need to be wary of some records. Hopefully among those whose interest in micros is stimulated by being able to name them, there may arise a renewed interest in fieldwork on the early stages, and not just the contents of a light trap.

The book is highly commended, and considering the amount of illustration, not overpriced.

DAVID AGASSIZ

Invertebrate Conservation News (ICN)
Invitation to join the Editorial panel
Information about ICN

Invertebrate Conservation News, including versions under earlier titles, has been published by the Amateur Entomologists' Society (AES) since 1969. It is aimed mainly at the amateur naturalist and provides a unique range of information and ideas about invertebrate conservation in the UK and worldwide. Its readers include AES members, who rate it as a major benefit of their membership, and external subscribers in various countries. *ICN* is currently produced three times per year and accompanies the *AES Bulletin* (Feb. – Jun. – Oct.) and *Entomologist's Record* (Mar. – July. – Nov.). The AES plans to increase the frequency to four times a year.

Voluntary posts currently available

1. Editorial panel members

You do not need to be a member of the AES in order to join the panel. Your role would be to send the *ICN* editor (currently Dr. David Lonsdale) drafts of articles or brief items, covering any of the following aspects of invertebrate conservation worldwide:

- News, projects, or announcements (e.g. regarding the effects of climate change or the implications of legislation) of relevance to the conservation-status of invertebrates in general.
- Specific news (e.g. especially involving habitat management) about particular invertebrate species or sites of particular interest for conservation.
- Results of scientific research of particular interest (e.g. on eco-friendly kinds of pest control).
- New publications, including books and leaflets, on any aspect of invertebrate conservation.
- Events, like field meetings and conferences on aspects of invertebrate conservation.

In order to see what sort of items would be suitable, please see a recent issue of *ICN* (the June 2012 issue is available free from: <http://www.amentsoc.org/icn-example.pdf>). In particular, there is a strong emphasis on items relevant to the protection and management of habitats. For this reason, *ICN* usually does not include news about year-to-year fluctuations in the abundance of species like butterflies, except where this has longer-term implications.

Depending on your interests and your access to Internet and printed publication, you could make use of reasonably authoritative sources such as reports or announcements from conservation organisations, research institutes or government departments. News media and publications such as magazines with a very general readership are not usually suitable sources in their own right but they sometimes a very useful starting-point for looking information in more detail.

2. Editorial Assistant (only one post currently available)

Your role would be to:

1. look for items of interest and provide drafts, as above for other members of the panel
2. deputise for the *ICN* Editor if necessary.
3. co-ordinate and collate copy for each issue, in collaboration with the *ICN* Editor.

Please contact the *ICN* Editor if you are interested, at: icn-submission@amentsoc.org

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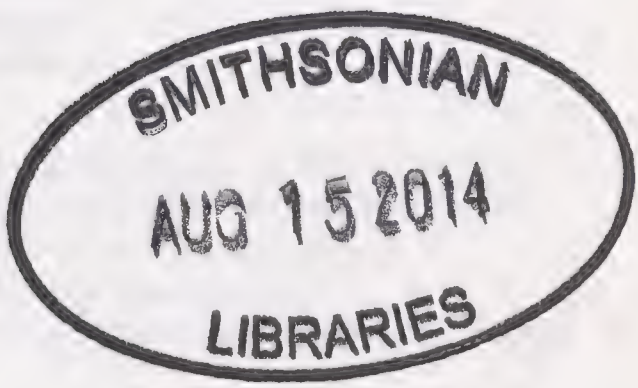
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Editor:

J. S. Badmin, H.F.R.E.S.
Coppice Place
Perry Wood
Selling
nr Faversham
Kent ME13 9RB
Tel: 01227-752291
email: jbadmin@btinternet.com

Editorial Committee:

D. J. L. Agassiz, M.A., Ph.D., F.R.E.S.
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Part 4 – December 2013

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SEED PREDATION OF YELLOW RATTLE *RHINANTHUS MINOR* BY *PHYTOMYZA VARIPES* (DIPTERA: AGROMYZIDAE), WITH NEW BRITISH RECORDS

DAVID PENNEY¹, BEN NOTCUTT² & JENNIFER K. ROWNTREE^{1,2}

¹*Faculty of Life Sciences, The University of Manchester, Manchester, M13 9PT
david.penney@manchester.ac.uk*

²*Department of Biology, University of York, Wentworth Way, York, YO10 5DD*

ABSTRACT

The occurrence of the pre-dispersal seed predator, *Phytomyza varipes* Macquart (Diptera: Agromyzidae) was investigated in eleven wild populations of the hemi-parasite yellow-rattle *Rhinanthus minor* (Orobanchaceae) in the UK. *Phytomyza varipes* was present in all of the plant populations studied. The sites in Somerset, Kent, Gloucestershire, Herefordshire (two sites), Cambridgeshire, Leicestershire, Lincolnshire (two sites) and Gwynedd represent new locality records for this fly species, which has been rather poorly studied in the UK. Levels of abundance were significantly different between populations, with particularly high numbers found in the Heath's Meadow (Lincolnshire) population. The presence of *P. varipes* was positively correlated with total seed number and the number of non-viable seeds. No physiological trade-off between size and number of *P. varipes* puparial cases was found. This fly species is probably more widespread in the UK than current data would suggest.

INTRODUCTION

The dipteran family Agromyzidae (Brachycera: Opomyzoidea), commonly referred to as leaf-miner flies are globally distributed with approximately 910 described species in 23 genera occurring in Europe (Oosterbroek, 2006). The known world fauna consists of approximately 2800 described species, probably representing just over half the expected total (Boucher, 2010). The 400 or so British species were revised by Spencer (1972), but their distribution and biology are poorly known, presumably because of their tiny size and cryptic habits. These minute flies have mining/boring larvae, which tend to be host-species specific (monophagous). They are usually found in the stalks or leaves of herbs and woody plants, but sometimes occur in roots, flower heads, in the youngest wood of trees or in seedpods, including those of some economically important plants (Oosterbroek, 2006). Some of the more polyphagous species that feed on plants from many different families can be serious pests of both agricultural and ornamental plants. Therefore, any additional ecological data on these flies can be considered a useful contribution to our current, rather depauperate knowledge base on their distribution in the UK.

The yellow-rattle *Rhinanthus minor* L. *s.l.* (Orobanchaceae [formerly included in Scrophulariaceae]) is a hemi-parasitic plant commonly found in the grasslands of Europe and North America (Westbury, 2004). At present six subspecies may be recognised in the British Isles, but some populations do not fit into any of them and the pattern of variation is more complex on the continental mainland (Stace, 1991; Preston, Pearman & Dines, 2002). During a study to investigate the genetic population structure and relative fitness of *R. minor*, numerous puparia were discovered inside the seedpods. The flies that emerged were identified as *Phytomyza varipes* Macquart (Diptera: Agromyzidae), known to develop within the seedpods of this plant (Westbury, 2004). *Phytomyza varipes* is termed a pre-dispersal seed

predator since the damage inflicted by its larvae takes place before the mature seed has had the opportunity to disperse, in contrast to many seeds which are predated on after dispersal in the ground layer seed bank (Crawley, 1983). *Phytomyza varipes* is widely distributed throughout continental Europe and also occurs in Greenland and Canada, with *R. minor* being its only known host plant in Britain (Pitkin *et al.*, 2012). Given the limited UK-specific published information on the ecology and distribution of *P. varipes*, the yellow rattle project was modified to include supplementary data collection on the flies. Our aims were to document new distribution records for *P. varipes*, determine whether there was any relationship between the presence of *P. varipes* and the number of damaged seeds, and to investigate any potential physiological trade-off between size and number of *P. varipes* puparia within the seedpods.

METHODS

Rhinanthus minor s.l. plants were collected from eleven wild populations in England and Wales between May–July 2011. The sites surveyed were: St Gabriel’s (Dorset), Skylark Meadow (Somerset), Marden Meadow (Kent), Beechwood House, Wye Valley (Gloucestershire), Quebb and Stocking’s Meadows (Herefordshire), Houghton Meadow (Cambridgeshire), Muston Meadow (Leicestershire), Heath’s and Willoughby Meadows (Lincolnshire) and Eithinog, Bangor (Gwynedd) (see Table 1 for site details). For each plant the total number of seedpods was counted.

Table 1. Numbers of seedpods found in the *R. minor* populations and basic statistics. Unless stated, data presented are mean values with standard errors.

Site	OS Grid reference	Plants sampled	Mean number of			
			Seedpods per plant	Seeds per plant	Non-viable seeds per plant	<i>P. varipes</i> puparia per plant
St Gabriel’s field (STG), Dorset	SY398924	46	7.67 ± 0.48	70.13 ± 4.96	2.80 ± 0.76	0.02 ± 0.02
Skylark Meadow (SK), Somerset	ST346390	35	11.0 ± 0.59	112.0 ± 7.10	9.31 ± 1.28	0.26 ± 0.07
Marden Meadow (MA), Kent	TQ762445	46	9.59 ± 0.35	71.6 ± 4.05	8.02 ± 1.19	0.20 ± 0.07
Beechwood House, Wye Valley (WV), Gloucestershire	SO536030	60	4.32 ± 0.20	42.6 ± 2.43	3.75 ± 0.72	0.08 ± 0.04
Quebb Meadow (Q), Herefordshire	SO301520	55	5.75 ± 0.33	44.3 ± 3.41	6.8 ± 1.11	0.22 ± 0.07
Stocking’s Meadow (STK), Herefordshire	SO633545	47	8.11 ± 0.38	69.5 ± 4.63	5.15 ± 1.02	0.11 ± 0.05
Houghton Meadow (HO), Cambridgeshire	TL292716	33	6.22 ± 0.39	52.2 ± 4.07	3.91 ± 0.92	0.15 ± 0.08
Muston Meadow (MU), Leicestershire	SK824364	57	6.18 ± 0.33	47.7 ± 3.34	4.53 ± 0.83	0.19 ± 0.06
Heath’s Meadow (HE), Lincolnshire	TF484639	51	8.80 ± 0.50	67.2 ± 4.16	6.73 ± 0.67	2.14 ± 0.23
Willoughby Meadow (W), Lincolnshire	TF472713	29	7.38 ± 0.66	59.8 ± 5.78	3.07 ± 0.69	0.52 ± 0.15
Eithinog, Bangor (B), Gwynedd	SH563712	35	12.7 ± 0.67	96.6 ± 8.26	9.2 ± 1.79	0.03 ± 0.03

The pods were carefully opened making sure that no seeds were lost, the seeds were separated from the plant material, and the total number of seeds per plant was recorded. It was also noted how many seeds were potentially viable and how many seeds were definitely non-viable (i.e. blackened or with visible signs of herbivore predation, such as holes or other damage). Many of the seedpods contained the small black puparia of *P. varipes*, and the number of these per individual plant was recorded. Adult flies emerged from some of the puparia and these were identified to species level using Spencer (1972); a series of voucher specimens were deposited in the Entomology Department of Manchester Museum.

To investigate any potential physiological trade-off between numbers of puparia per plant and puparium case size, *P. varipes* puparia were collected from a further 25 *R. minor* individuals from the Heath's Meadow (HE) population and placed into Eppendorf tubes, recording which plant they had originated from. The length and width of each puparium was measured under a Leica binocular light microscope ($\times 80$ magnification), with a 100 unit eyepiece calibrated against a piece of graph paper.

Statistical analyses

Presence/absence data for the occurrence of *P. varipes* puparia in each *R. minor* plant examined from all 11 populations were analysed using a contingency test. Data from Houghton Meadow (HO), Eithinog (B) and St Gabriel's field (STG) populations were then removed prior to an analysis of means for proportions due to the limited number of puparia found in each. For the HE population, number of puparia per plant was correlated with the total number of seeds and non-viable seeds using a Spearman's rank correlation. Non-parametric correlations were used as data for puparium case number and non-viable seeds were not normally distributed. The relationship between size (mean width $\times$ length) and the total number of puparia per *R. minor* individual in the HE population was assessed with a Spearman's rank correlation. A non-parametric correlation was used as puparium case number was not normally distributed. All statistical analyses were carried out using JMP version 9.0.2 (SAS Institute Inc.).

RESULTS

Phytomyza varipes was found at all the sites investigated (Table 1). Those in Somerset, Kent, the Wye Valley, Herefordshire, Cambridgeshire, Leicestershire and Lincolnshire in England and Gwynedd in Wales represent new vice county records for this species.

The number of *R. minor* plants containing puparia of *P. varipes* was significantly affected by population of origin ($\chi^2 = 125.8$, $P < 0.0001$, Fig. 1). Analysis of means for proportions showed HE population to have a significantly higher proportion ($P < 0.05$) of *R. minor* containing puparial cases and the WV population to have a significantly lower proportion ($P < 0.05$) of *R. minor* containing puparial cases than the average proportion for all populations.

There was a significant correlation between the number of puparia present in the HE population and the total number of seeds per plant (Spearman's $\rho = 0.47$, $P = 0.0005$) suggesting that the number of *P. varipes* puparia reflects the food resource available (Fig. 2). There was also a significant correlation between the number of puparia present in the HE population and the number of damaged and non-viable seeds (Spearman's $\rho = 0.74$, $P < 0.0001$) suggesting that damage inflicted on the plant reflects specific herbivory pressure (Fig. 3).

There was no significant correlation between the mean size (length $\times$ width) of the *P. varipes* puparia and the total number of cases collected per plant (Spearman's

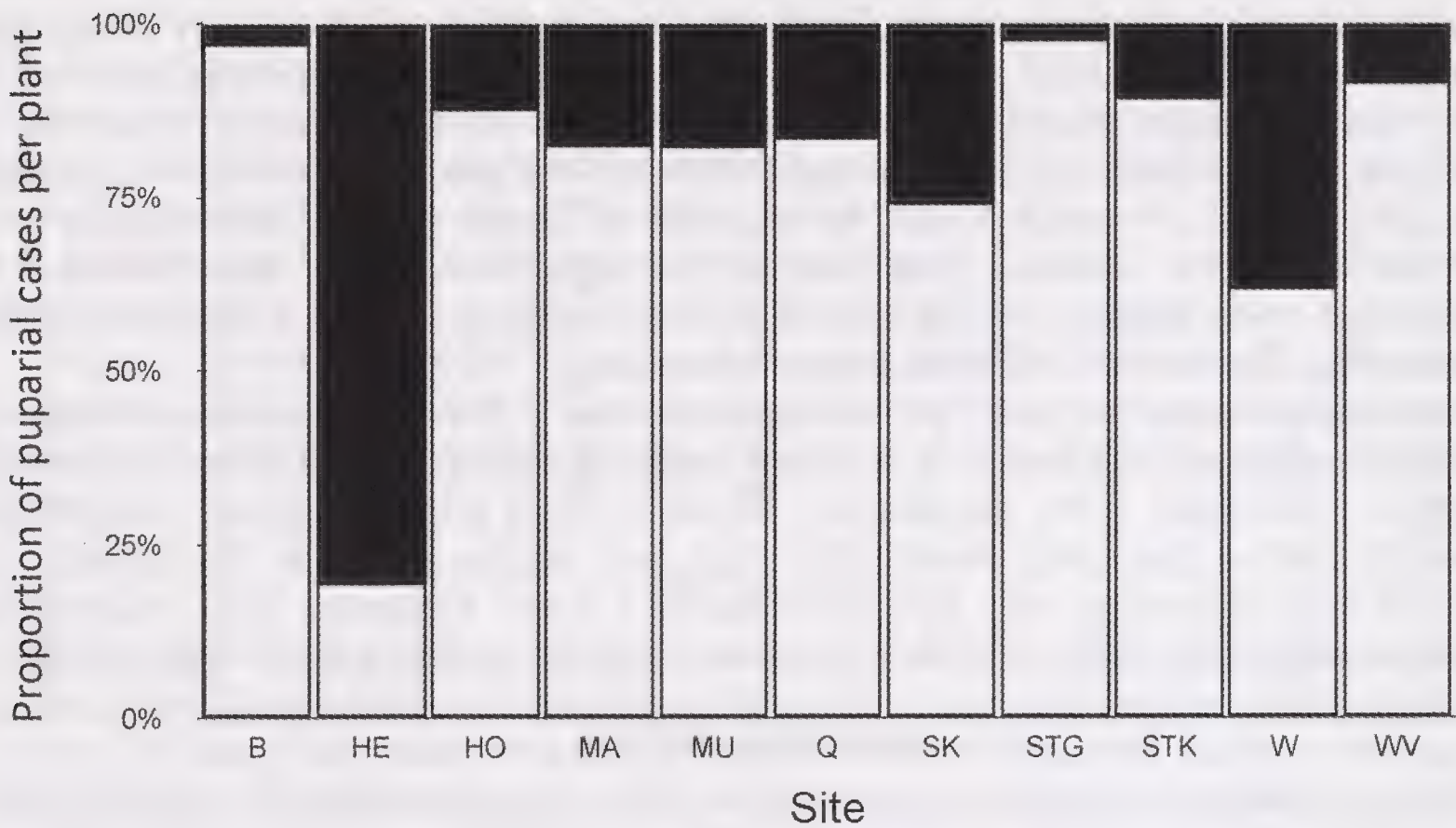


Fig. 1. Proportion of *Rhinathus minor* plants with puparial cases of *Phytomyza varipes* in their seedpods from populations sampled at 11 sites in England and Wales between May–July 2011. Black bars denote plants with puparial cases and white without. Sites are Eithinog, Bangor (B), Heath’s Meadow (HE), Houghton Meadow (HO), Marden Meadow (MA), Muston Meadow (MU), Quebb Meadow (Q), Skylark Meadow (SK) St Gabriel’s Meadow (STG), Stocking’s Meadow (STK), Willoughby Meadow (W), Beechwood House, Wye Valley (WV). See Table 1 for grid references.

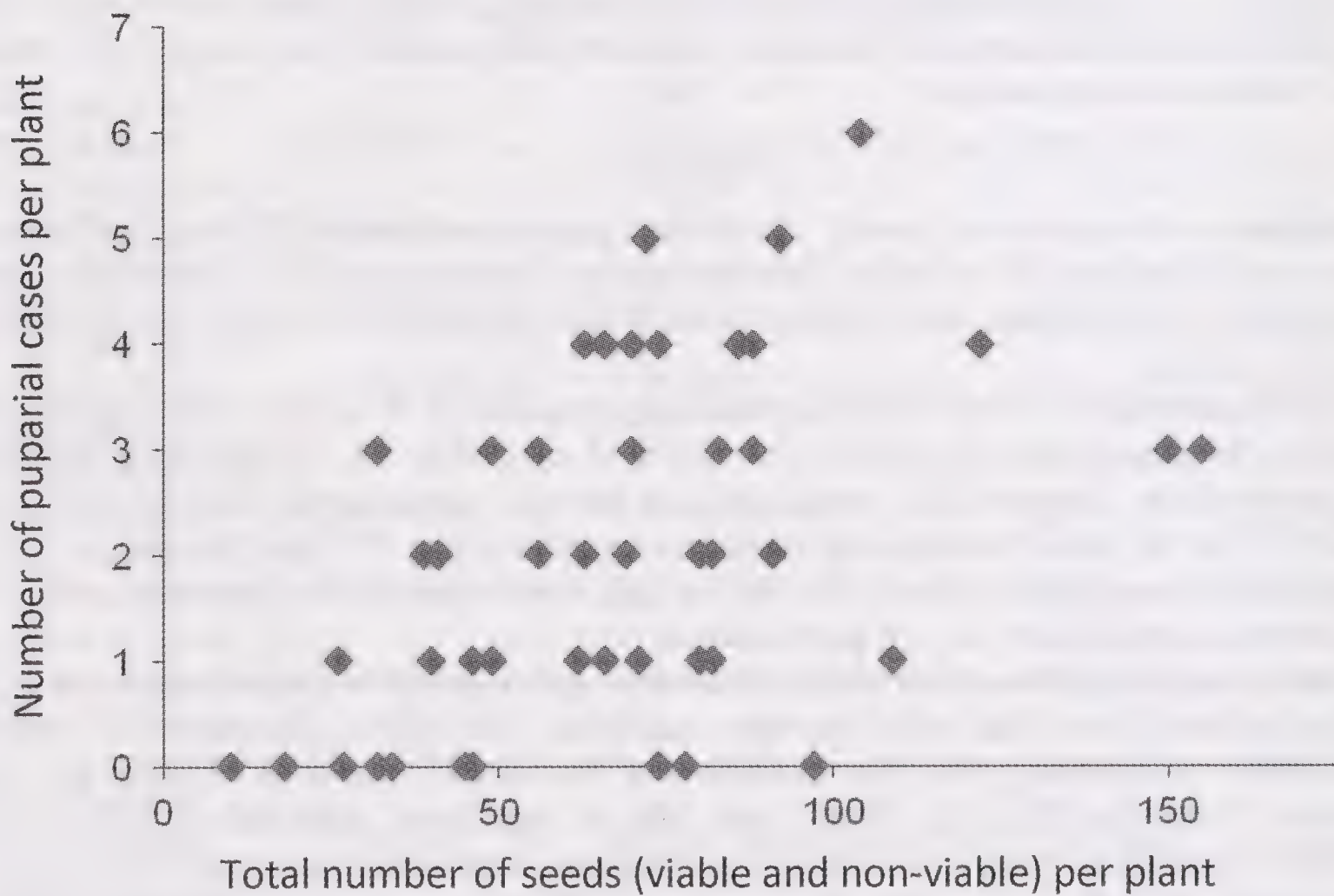


Fig. 2. Number of puparial cases of *Phytomyza varipes* per plant plotted against the total number of seeds per plant for the Heath’s Meadow population, Lincolnshire, 2011. Spearman’s $\rho = 0.47$, $P < 0.0005$.

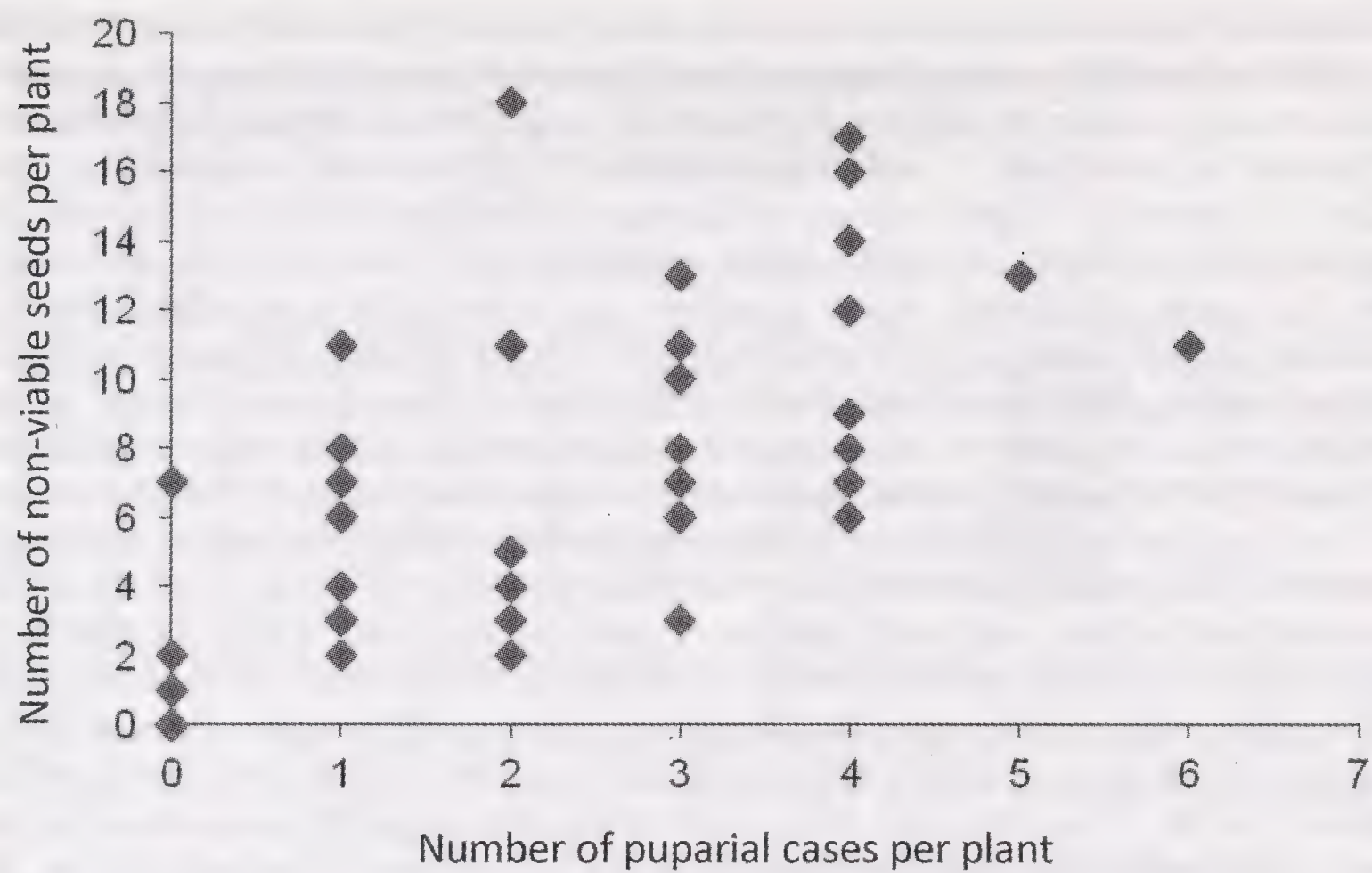


Figure 3. Number of non-viable (blackened, eaten) seeds of *R. minor* plotted against the number of puparial cases of *P. varipes* per plant for the Heaths population. Spearman's $\rho=0.74$, $P<0.0001$.

$\rho=0.11$, $P=0.63$), indicating that there was no demonstrable trade off between the size and number of puparia.

DISCUSSION

The primary data collected add substantial information to the known distribution of *P. varipes* in Britain (see Table 1). Previously this species has been recorded from the Inner (Isle of Lewis and Isle of Coll) and Outer Hebrides, Tiree and Rum, Cambridgeshire, East Norfolk, East Suffolk, East Sussex, Glamorgan, North Somerset, West Norfolk and West Suffolk. It is known from Ireland and is widespread in continental Europe and also occurs in Iceland, Greenland and Canada (Griffiths, 1961, 1966; Spencer, 1976 [and earlier references therein]; Waterston, 1981; Bland, 1992; Deeming, 1995; Skidmore, 2008a, 2008b; Pitkin *et al.*, 2012). Given that this species was found in all sites studied, the expectation is that is likely to occur wherever there are large populations of *R. minor*.

The occurrence of *P. varipes* in the seed heads of *R. minor* was significantly different between populations sampled at the various sites. In most populations only small numbers were recovered, but comparatively large numbers were found in the Heath's Meadow population in Lincolnshire and comparatively small numbers in the HO, B, STG and WV populations. It is hard to know why the Heath's Meadow population experienced such a high level of herbivory, but rates of pre-dispersal seed predation are known to show great variability both spatially and temporally, and can be influenced by multiple factors including habitat (e.g. resource density, heterogeneity, connectivity), population size, the dispersal ability of the insect, and the abundance of higher trophic levels (Kolb, Ehrlen & Eriksson, 2007). Repeat surveys of the Heath's Meadow site are required to measure inter-year variation in agromyzid abundance in order to place these results into context. There are of course numerous other herbivores whose densities were not measured, which might also differ between populations. Westbury (2004) mentioned a variety of lepidopterans that feed on the seeds and flowers of *R. minor* and it is not unreasonable to expect that their

presence or absence may have a knock-on effect on the presence or absence of other herbivores such as *P. varipes* through competitive exclusion or via some other means.

The strong positive correlation between the occurrence of *P. varipes* puparia and the number of non-viable *R. minor* seeds in the HE population indicates that, when present, *P. varipes* is a likely source of damage to the plant. This was supported by circumstantial evidence, as puparia were often recovered from pods which contained seeds that were blackened, stuck together, and obviously non-viable. On some occasions puparia were found incriminatingly lodged between damaged seeds, and occupied pods often contained large quantities of frass (insect waste matter). Apparent mean mortality of seeds in seed pods measured in this way varied between 4.0% and 15.4% for the populations studied. It seems likely that *P. varipes* can cause seed loss to an individual *R. minor*, or when present in substantial numbers, an *R. minor* population. This impact however, may be offset partially by the correlation between puparium case number and total number of seeds on the plant, where the plants with higher numbers of seeds are those with the highest pressure from the seed herbivores.

The results suggest there was no physiological trade-off between the size and the number of *P. varipes* puparia in each seedpod. It may well be the case that there is no trade-off, but it is also possible that any existing relationship is obscured by other factors. Although phenotypic correlations, such as those investigated here, have frequently been used in field studies to imply a physiological trade-off, they provide little insight into the mechanisms that drive such systems, and there is a danger that uncontrolled variables (e.g. variable nutrient intake) can mask a trade-off, or cause spurious results (Zera & Harshman, 2001). Of course, a major assumption of our study was that all puparia in a seedpod derived from the same mother. Indeed, many phytophagous ovipositing insects will avoid host plants which have already been used by a conspecific, and this is particularly true for insects which attack fruiting bodies, such as seed predators (Jones, 1991). However, to address such questions thoroughly, prior knowledge of maternal parentage is required.

In summary, the abundance of the seed predator *P. varipes* was found to significantly differ between sites, with especially high herbivore pressure noted in the Heath's Meadow, Lincolnshire population. The presence of *P. varipes* significantly correlated with the total number of seeds and also the number of non-viable seeds in this population.

This short paper came about as a spin off from finding poorly studied seed predators within the seedpods of a study plant in research being conducted by JKR and BN. We would urge all researchers to pay special attention to insects (larvae, pupae and adults) found under similar circumstances and to seek their expert identification. Where possible the insects should be reared to the adult stage and records should be made of all the relevant life stages, with voucher specimens deposited in an appropriate museum. In many cases little will be known about the ecology and behaviour of the species concerned and a little extra effort may result in some beneficial findings that may be of use to the wider research community.

ACKNOWLEDGEMENTS

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SHORT COMMUNICATIONS

A first record of Beautiful Yellow Underwing *Anarta myrtili* (L.) (Lepidoptera: Noctuidae) on Mull, Argyll, Scotland. – On 29.iv.2012 whilst walking in an open glen near Lochbuie, Mull, Argyll, Scotland, NM6226, we disturbed one individual of the day flying moth *Anarta myrtili*. The specimen was quickly photographed and the photograph passed to Alan Skeates (VC103 recorder and Butterfly Conservation volunteer) on the island. Alan has almost completed the collation of all available historical and recent records of moths in his area and, after confirming the identification of the *A. myrtili* specimen, advised us that our sighting was the first known record for Mull.

The glen is dominated by purple moor grass *Molinia caerulea* with small patches of poor quality heather *Calluna vulgaris* growing in drier areas on the slopes. *Calluna vulgaris* is the foodplant for *A. myrtilli*. The habitat is quite typical of Mull so it is perhaps surprising that *A. myrtilli* has not been recorded before. It has been recorded elsewhere in VC103, with three records from Coll and one from Ulva. It is quite widespread in Scotland and other parts of Britain.

Anarta myrtilli is a diurnal species, flies freely in sunshine and is readily disturbed. Other species of similar habit seen during our walk included several individuals of the Common Heath *Ematurga atomaria* (L.) and several Ringed Carpet *Cleora cinctaria* (D. & S.), although the latter was more frequently attracted to light at our holiday cottage at Lochbuie NM6224.

We are very grateful to Alan Skeates for providing information for this note, for arranging the loan of traps and for encouraging us to record all of our sightings of moths and butterflies on Mull during our two week holiday. Butterfly Conservation and Scottish Natural Heritage financed the purchase of the traps and initiated the moth recording scheme for residents and visitors like ourselves. – M. T. JENNINGS & S. A. JENNINGS, 206 Lower Higham Road, Gravesend, Kent, DA12 2NN.

***Psallus luridus* Reuter (Hemiptera: Miridae) in North Wiltshire.** – This rather drab, yellow-grey bug is associated with young larch, *Larix* spp. (Pinaceae), and has relatively few published records. Woodroffe (1954) gives its distribution as Staffordshire, Suffolk, Hertfordshire, Gloucestershire and Surrey. Masee (1955) concurs. Woodroffe (1956) adds Berkshire, and the only other published record I have found, in southern England, is from Tollard Royal, Wiltshire, near the border with Dorset (Watsonian South Wiltshire, VC8) (Woodroffe, 1960). After several years of trying to find this bug myself, I finally succeeded on 15 July 2012 at Cobham Frith, near Marlborough (SU255671, North Wiltshire, VC7), beating a row of larches, 5–10 metres tall, taking three specimens from a single tree. This is presumably a new vice-county record.

Southwood & Leston (1959) comments that the bug is ‘certainly more widespread’ than records suggest, a view perhaps vindicated by its subsequent discovery in East Yorkshire (Crossley, 1972).

Images of the bug can be found on the excellent website Danmarks Blomstertæger (http://www.miridae.dk/psallus_luridus.htm). – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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AERIAL PLANKTON AND A MASS DROWNING OF INSECTS IN NORTHERN FRANCE

RICHARD A. JONES

135 Friern Road, East Dulwich, London SE22 0AZ
bugmanjones@hotmail.com

ABSTRACT

Millions of males (and a few queens) of the black pavement ant, *Lasius niger* L., were washed up dead on the sandy shore at Trouville-sur-Mer, France in June 2002. With them were a number of beetle species, which must have formed part of a vast cloud of aerial plankton, later dashed into the English Channel by a thunderstorm. Sixty-nine species of Coleoptera were identified, along with four species of Hemiptera and one of Dermaptera.

INTRODUCTION

On Saturday 1st June 2002, I took a family holiday to a village near Caen in Normandy, France. The drive from Calais was as straightforward as is all driving through northern France, but it was remarkable for the incredible number of flying insects continually crashing into the windscreen. The day was sunny, warm and humid and very many insects were on the wing. By the end of our journey, the front of the car was completely discoloured by invertebrate innards and the car was all but out of screen-wash. The only other time I can remember such an experience was driving on one of the state highways in Florida, one hot humid afternoon some years ago, shortly before a tropical storm.

Sure enough, on that evening of 1st June a dramatic lightning show and thunderstorm swept in along the Normandy coast. At our gîte, about 15 km south of the Channel, we missed most of the booming storm that lit up the night sky in the distance, but there was torrential rain for short periods that night, enough to clean the car a little.

On Monday 3rd June we visited the seaside town of Trouville-sur-Mer, on the Normandy coast between Dieppe and Le Havre. The gently sloping sand beaches here were perfect for the children to paddle and make sand castles. It was whilst sitting on the beach here that some black rippling lines across the pale sand caught my eye (Figs 1a and 1b). At first I took them to be lines of dark silt, washed up on the beach from the small river that ran out into the sea here. But looking closer, I discovered them to be strandlines of dead insects (Fig. 2).

DISCUSSION

There were countless multitudes of insects. A very conservative tally gave about 500 dead insects per linear 10cm of each strandline. There were at least five oscillating strandlines stretching as far as the eye could see across the beach. It is impossible to guess how many other beaches in the area also had these insect strandlines, but it is unlikely that Trouville-sur-Mer was alone in having the dead insect tide. An extremely rough estimate, therefore, is of 25 million insects per kilometre washed up dead onto the beaches of Normandy that weekend.

By far the great majority of the washed-up insects were winged males of the common black pavement ant, *Lasius niger* L. (strangely there were only a handful of queens). The ants made up seemingly 99.9% of the casualties. This figure is not mere

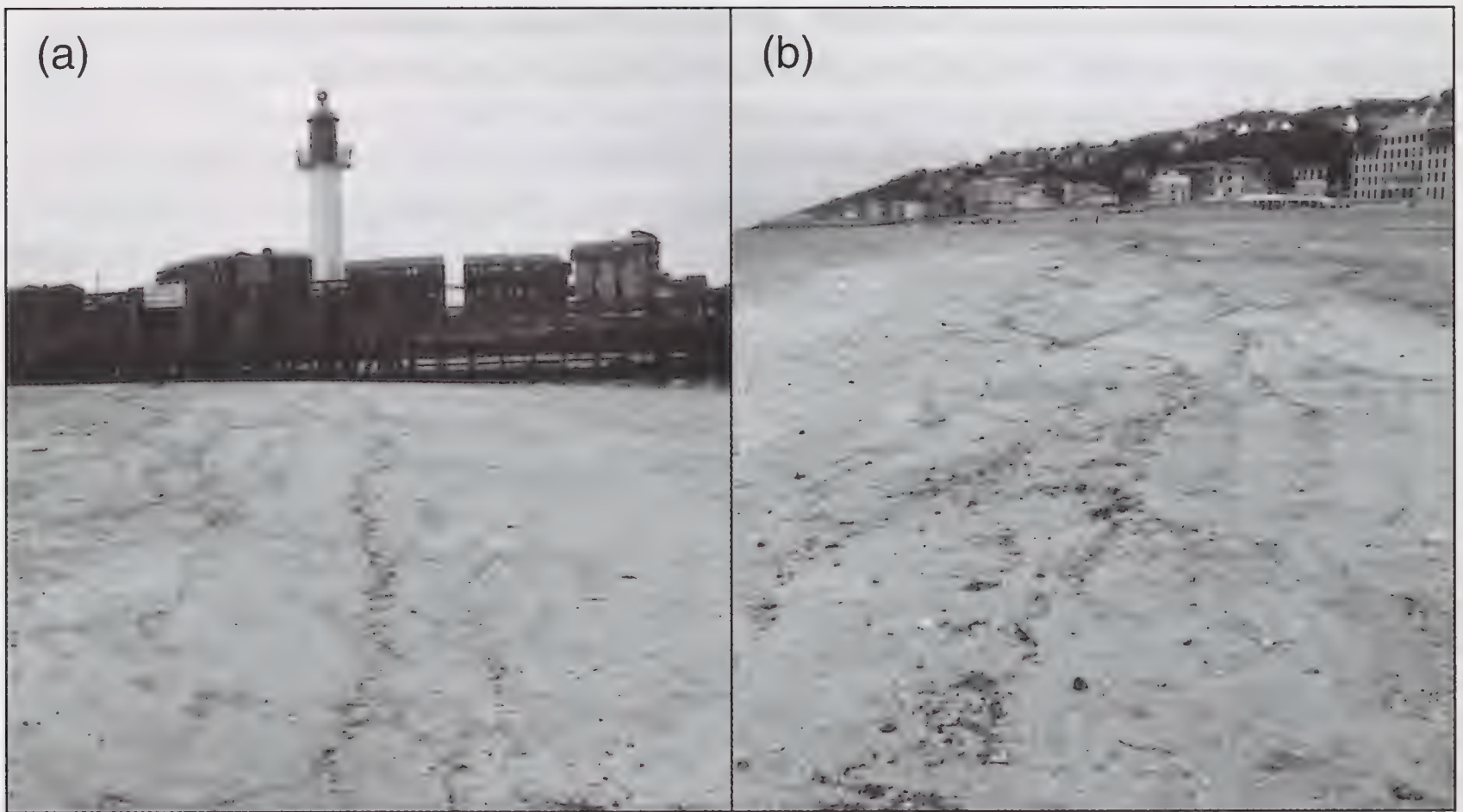


Fig. 1. The beach at Trouville-sur-Mer, France looking (a) west and (b) east, on 3 June 2002, showing the undulating strand lines of dead insects.

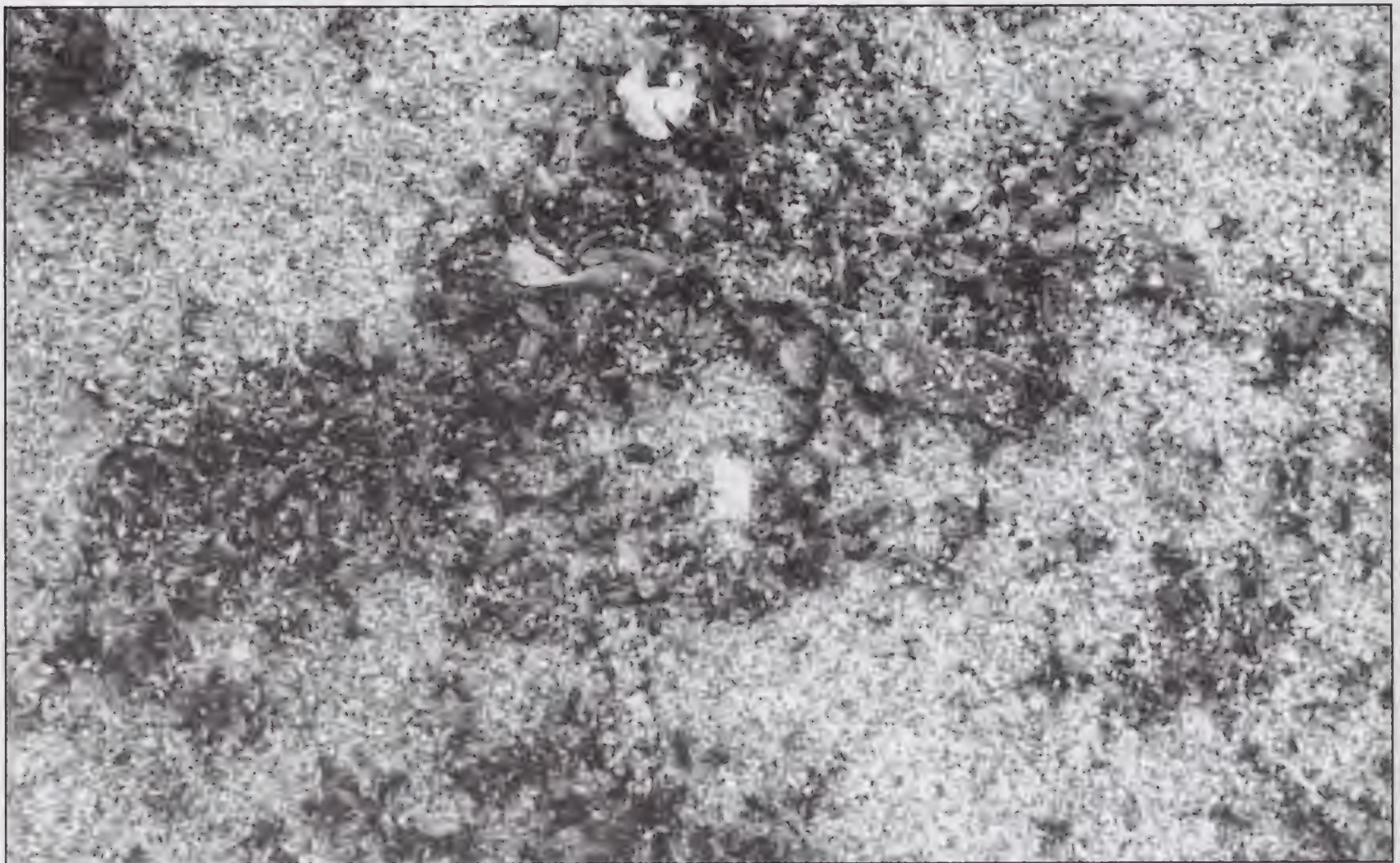


Fig. 2. Close up of the strand line showing a mass of dead ants and a few beetles.

hyperbole; mingled in with the ants were a number of other insects, about one for every 1000 ants. There was a sawfly and an ichneumon, but most of the other insects were beetles. I made a small sample collection of these. It has taken 10 years, but I eventually found time to sit down and identify them, and a list of species is given in Table 1.

The insect fauna of this part of Normandy is very similar to that of southern England. The beetles give a flavour of what must have been in the huge cloud of

aerial plankton as it was wafted up away from the coast, then drenched and deposited into the sea. There were some wetland meadow species (most of the carabids, hydrophilids, staphylinids and some of the chrysomelids and weevils); some coastal/sand/undercliff species (*Psilothrix viridicoeruleus* (Geoffroy in Fourcroy), *Clanoptilus marginellus* (Olivier), *Platynaspis luteorubra* (Goeze)), and some woodland species (*Agrilus sulcicollis* Lacordaire, *Pachytodes cerambyciformis* (Schrank), *Curculio glandium* Marsham, *Pissodes pini* (L.) and the scolytids).

Reports of mass strandings of insects are scattered through the literature. Burr (1939) recounts the tale, from 1784, of a locust swarm that reputedly covered 2000 square miles of South Africa, before being blown out to sea. The corpses were then washed up in a bank “three of four feet high along the beach for a distance of fifty miles, and the stench of their rotting bodies could be smelt at a distance of 150 miles.”

Darwin (1839) recounts how on several occasions in late 1832 the rigging of the Beagle, floating 60 miles off the mouth of the River Plata between Argentina and Uruguay, was coated in the gossamer strands of countless thousands of ballooning spiders. For those that landed on the ship unimaginable numbers must have been lost in the ocean.

Tutt (1901, 1902) summarizes a large number of anecdotal and published reports of beetles accumulating on or near beaches. Most of these are British accounts, but he also includes several overseas events. His interest in these observations was to examine any possible migratory tendencies of the insects. Johnson (1969) in his key work on insect migration and dispersal makes reference to several instances of large numbers of beetles accumulating on the east coast of England, particularly about the time of the two equinoxes. The inference is that equinoctial winds and storms spread, then deposit the beetles when they are flying from or to over-wintering sites and hibernacula (Walsh, 1926, quoted by Johnson, 1969).

Majerus (1994) reported an estimated 23.6 billion 7-spot ladybirds, *Coccinella septempunctata* L., washed up along 400 miles of south and south-east England coastline in 1976. There were only a very few 7-spot ladybirds amongst the insect strand debris I found, among several other coccinellid species. Ladybird ‘swarms’ are uncommon, but their appearance is regularly noted because of the ladybirds’ distinctive appearance and popular appeal. These occurrences are thought to depend on various factors including high over-wintering survival rates, good availability of food earlier in the season, breeding success, but then poor availability of food at the end of the season leading to mass migration until they reach the coast (Muggleton, 1977). One of the earliest reports is from north-east England by Bold (1873); a recent summary of various historical reports and modern research is given by Denemark & Losey (2010).

Breeze and wind dynamics along a coastline may be just as important a corralling mechanism as it simply being the edge of the land. Isard *et al.* (2001) looked at insect accumulations in the Great Lakes region of central North America. They postulated that air at a cool front moving inland off water warms and rises, initially lifting insects upwards; these then get caught in the high-altitude counter-flow back out over the lakes. Here down-draughts bring the flying insects close to the water’s surface and onshore breezes blow them back to land onto the beaches or dunes.

In response to a plea to the online British beetles internet forum (beetles-britishisles@yahoogroups.com) several coleopterists have reported finding stranded beetles (especially ladybirds) along the shoreline. Clive Turner (*pers. comm.*) commented: “From what I have seen there are mass strandings of insects on the shore line every day – they just don’t occur in the densities we readily take note of until an exceptional day lands in our lap.” He had an exceptional day at Dawlish Warren several years ago. Jim Jobe (*pers. comm.*) reported a “mass stranding near

Table 1. Beetles and other insects washed up dead, along with countless millions of males of *Lasius niger*, onto the shore line at Trouville-sur-Mer, Normandy, France, 3 June 2002. All were single specimens collected, unless otherwise stated.

COLEOPTERA

Carabidae

Notiophilus quadripunctatus Dejean
Bembidion iricolor Bedel
Bembidion guttula (F.), several specimens
Bembidion properans (Stephens)
Agonum thoreyi Dejean
Stenolophus mixtus (Herbst)
Pterostichus vernalis (Panzer)
Demetrias atricapillus (L.)
Syntomus foveatus (Geoffroy in Fourcroy)
Syntomus obscuroguttatus (Duftschmid)

Hydrophilidae

Cercyon species
Helochares lividus (Forster)
Helophorus species, several specimens

Staphylinidae

Platystethus cornutus (Gravenhorst)/ *P. degener* Mulsant & Rey
Platystethus arenarius (Fourcroy)
Paederus fuscipes Curtis, several specimens
Paederus riparius (L.)
Tachyporus nitidulus (F.)

Buprestidae

Agrilus sulcicollis Lacordaire

Elateridae

Athous species

Phalacridae

Phalacrus caricis Sturm

Cryptophagidae

Atomaria species, many specimens

Cantharidae

Cantharis lateralis L., many specimens

Dasytidae

Psilothrix viridicoeruleus (Geoffroy in Fourcroy), many specimens

Malachiidae

Clanoptilus marginellus (Olivier)
Anthocomus fasciatus (L.)
Charopus pallipes (Olivier)

Kateretidae

Kateretes pedicularius L.

Coccinellidae

Coccidula rufa Mulsant
Coccinella septempunctata L., several specimens
Platynaspis luteorubra (Goeze)
Hippodamia tredecimpunctata (L.)
Scymnus femoralis (Gyllenhal)
Scymnus interruptus (Goeze)
Scymnus haemorrhoidalis Herbst

(continued)

Table 1. (continued)

Oedemeridae

Oedemera lurida (Marsham)

Oedemera nobilis (Scopoli)

Chrysomelidae

Chrysolina polita (L.)

Phratora laticollis Suffrian, several specimens

Phaedon armoraciae (L.)

Oulema melanopus (L.)/ *O. rufocyanea* (Suffrian), several specimens

Oulema obscura (Stephens)

Prasocuris junci (Brahm)

Gastrophysa polygoni (L.)

Chaetocnema hortensis (Fourcroy), several specimens

Chaetocnema picipes Stephens, several specimens

Phyllotreta nemorum (L.), several specimens

Phyllotreta nigripes (F.)

Altica species

Longitarsus species

Cerambycidae

Pachytodes cerambyciformis (Shrank)

Clytus arietis (L.)

Apionidae

Protapion assimile Kirby

Curculionidae

Archarius pyrrhoceras (Marsham)

Curculio glandium Marsham

Ceutorrhynchus species, several specimens

Sitona cylindricollis (Fahraeus), several specimens

Sitona lineatus (L.), several specimens

Orchestes signifer (Creutzer)

Limnobaris dolorosa (Goeze)

Limnobaris t-album (L.)

Pissodes pini (L.)

Hylesinus varius (F.)

Hylastes ater (Paykull)

Hylastes attenuatus Erichson, several specimens

Pityogenes chalcographus (L.)

Orthotomicus erosus (Wollaston)

Scolytus mali (Bechstein & Scharfenberg), several specimens

Tanysphyrus lemnae (Paykull)

HEMIPTERA

Cercopidae

Cercopis vulnerata Rossi

Delphacidae

Stenocranus minutus (F.), several specimens

Miridae

Cyllecoris histrionicus (L.)

Lygaeidae

Scolopostethus species

DERMAPTERA

Labiidae

Labia minor (L.)

Llangurog in Ceredigion, West Wales, some years ago. There were literally thousands of drowned beetles, mostly staphs (mostly *Philonthus* spp.) and carabids all along the shoreline.” Paul Mabbott (*pers. comm.*) also reported a stranding on Scarborough North Beach: “I was perplexed by shoreline deposits containing large numbers of ground beetles. This followed a very wet night and the small river that debouches at the north of the beach had flooded taking vegetation and fauna into the sea where it was deposited by waves.” A similar event was witnessed by Peter Macdonald (*pers. comm.*) “I cannot help you with a reference, but I witnessed a similar thing a few years ago. We were walking along the beaches of the Hel Peninsula, north of Gdansk on the Baltic coast of Poland. There was a strand line of beetles which went on for miles. Every one which I looked at was a water beetle. They seemed to have been washed into the sea with the huge annual outflow of spring meltwaters. We had been in the east of the country for the preceding two weeks, and all of the rivers were in spate and many had burst their banks. Several of them join together and discharge at Gdansk.”

Although the dead bodies of beetles (including ladybirds) are robust enough to survive in salt water long enough to wash up on the shore a day or two later, other insects are stranded too. John Muggleton (*pers. comm.*) reported: “We collected samples of dead ladybirds from the strandlines in 1976 and all contained dead specimens of the hoverflies *Episyrphus balteatus* (Fallén), *Eupeodes luniger* (Meigen) and *Syrphus vitripennis* Meigen.”

The make-up of aerial plankton is rather poorly understood; by its very nature it is up in the air and almost unobservable until it makes landfall again. However, there are high-altitude aerial netting studies; Chapman *et al.* (2004), hoisting nets to about 200m under helium-filled blimps, recorded a long list of high-flying insects, notably large numbers of aphids and small flies, but they also found some small beetles, including a few ladybirds.

Mass emergence of flying ants is a well-known and well-documented phenomenon. Mass fatality must be an inevitable result, but the dramatic concentration of the bodies on a strandline does not appear to be very widely reported. I did, however, find a short anecdotal report of such an event by scouring the internet (Anon, 2009); a photo appears to show a mass of large black ants on the sand, but the brief report, from El Portil Beach, at Huelva, Spain, in October 2009 states only ‘a swarm of giant ants’.

The near absence of queens from the wash-up in Normandy seems remarkable since, by their very nature, successful mating flights depend on synchronizing male and female emergence. I can only imagine that maybe the females landed to attempt starting their new colonies before the wind took them out to sea, or the rain plunged them into the water. As they are larger insects, perhaps they are more powerful and were better able to battle against the offshore breeze.

The mating (‘nuptial’) flights of ants often make national headlines. Frequently these articles are ill informed, and often accompanied by pictures of other insects, like clustered mayflies (Anon, 2010). Most of these reports finish with a sentiment along the lines of ‘the males do not live very long after mating’. The countless millions I found dead on a French beach are a sure testament to this.

ACKNOWLEDGEMENTS

My thanks to Paul Mabbott, Jim Jobe, Peter Macdonald, John Muggleton and Clive Turner for offering their reports and thoughts on beetle wash-ups, and to Don Reynolds for pointing me in the direction of his and other published work on high-flying and water-stranded insects.

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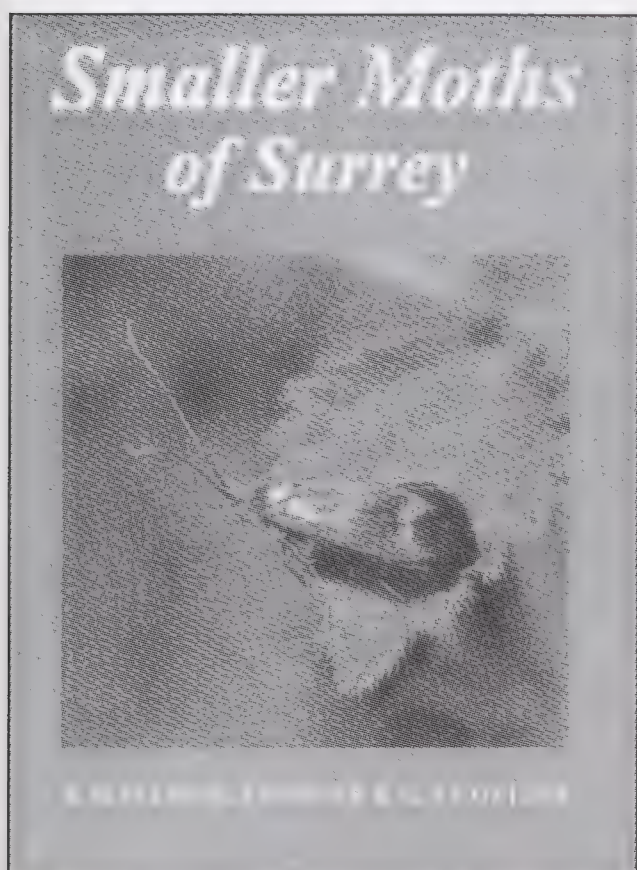
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BOOK REVIEW

The Smaller Moths of Surrey by Bob Palmer, Jim Porter & Graham A. Collins. Surrey Wildlife Trust, 2012. Hardback, 543pp, 32 colour plates. £28.00 plus p&p. ISBN 978 0 9556188 3 3.

This account of the micro-moths of Surrey is part of an impressive list of titles covering this county in a convenient A5 format. It is printed on a coated paper which makes it more than twice as heavy as its counterpart on the larger moths, even though it is only a little thicker. This may make it less easily used as a field companion.

The introductory chapters describe the area of the county which, most sensibly, is the vice county 17, a permanent area for recording including the south western part of Greater London. There is a



chapter on the surface geology, repeated from the book on the larger moths. The same maps are used which give the boundaries of the chalk North Downs as well as other significant areas, this I find very sensible. There is a chapter on recording methods, both by night and by day which is reasonably comprehensive although no mention is made of the use of a bee smoker. A brief chapter on conservation is appended with a list of BAP priority species which have been recorded in Surrey. There is then a concise section describing the species accounts which primarily cover the last 25 years.

The species accounts form the greater part of the book, in most cases accompanied by a distribution map with solid circles for each tetrad where the species has been recorded during the survey period. Mention is made of historical records, 'Surrey status' is assigned to each one and there are comments about its occurrence and distribution, both within the county and nationally. Scientific names only are used for species and the taxonomy broadly follows Bradley's 2000 checklist with a few terminations altered in the Pterophoridae. Only the English names are given for food plants, which makes an interesting change as usually it is botanists who are more ready to use botanical names.

There is a section of 32 coloured plates in the middle of the book depicting examples (either adults or early stages) of each of the families of microlepidoptera. They are good pictures which might capture the interest of potential microlepidopterists, but do not add to the scientific value of the book.

I lived in Surrey when I began collecting micros in the late 1950s. It was one of the better known counties since regular field meetings of the (then) South London Entomological & Natural History Society often occurred there, and Stan Wakely was a regular attender encouraging many others to take an interest in micros. Even then I was aware of the great number of records with many people commuting to work in London from leafy suburbs, but no attempt had been made to write a county fauna. This book contains an amazing amount of data, most of it assembled during the last decade by a dedicated band of enthusiasts; over 100 people contributed records and the maps are remarkably comprehensive. Historic data were taken from published literature and the collections of the Natural History Museum and of this Society are often quoted. There is no mention of the collection of Robin Mere in Edinburgh, or of Stan Wakely in Cambridge, or of J. W. Metcalfe in Bristol to name a few. This means that the information from the past is not exhaustive, but this weakness is outperformed by a very impressive snapshot of the fauna at the present time. A little more research might lead to a reassessment of some historic records, e.g. were *Cydia microgrammana* really that species or were they *C. medicaginis*?

It is very noticeable how many species which have recently colonised the country or the county feature in this work, and in the course of their labours in the field the group of recorders have discovered four species new to Britain: *Bucculatrix ulmariae*, *Coleophora calycotomella*, *Elachista nobilella* and *Schiffermuelleria schafferella*. This shows what can be achieved by a group of field workers collaborating in such a project. They are to be congratulated on this publication which will be essential to resident lepidopterists and of interest to those in neighbouring counties.

DAVID AGASSIZ

SOME INSECTS, MAINLY ORTHOPTERA, FROM BARRAU, SOUTH-WEST FRANCE

ROGER D. HAWKINS

30D, Meadowcroft Close, Horley, Surrey, RH6 9EL
(Email: rogerdhawkins@hotmail.co.uk)

A recent issue of this journal included an announcement by our member Jennifer Boncey (Volume 23, Part 1, inside back cover), offering free use of her holiday cottage in return for biological records from the site and its surroundings. For the last ten years she has lived in the farmhouse of Barrau in south-west France, surrounded by six hectares of land that she manages as a nature reserve (Fig. 1). The property consists of two fields bordered by woodland, largely of sessile oak (*Quercus petraea*) (Fig. 2). One long flat field extends south along a former entrance track and is partly unimproved, while a steeply sloping north-facing field was formerly arable and has been allowed to regenerate naturally. Both fields are managed by partial and infrequent mowing. The site includes a large dead oak tree and an old pond, and is crossed by hedges which included many kinds of trees. It is set in an attractive countryside of rolling hills forming ridges between small streams flowing north-east to join the mighty river Garonne. Barrau is a farm set on top of one of these ridges at UTM grid reference 31T 0336748658 and adjacent to the tiny hamlet of Haumont, in French political terms in the *commune* (= parish) of Esparsac in the *département* (= county) of Tarn-et-Garonne in the *région* of Midi-Pyrénées. In practical terms it lies 120 km north of the Pyrenees, 50 km north-west of the city of Toulouse and just 5 km north of a small market town, Beaumont-de-Lomagne. The surrounding area has many small woods, probably preserved through the ages by the love of the French countryman for hunting (shooting), since both deer and wild boar are present. The lower slopes are largely devoted to agriculture, with garlic and sunflowers being the main crops.

Jennifer has previously joined Butterfly Conservation, the Amateur Entomologists' Society and other groups, and made the same offer to their members, so there is now an impressive file of survey reports. A particularly good list of reptiles and amphibians was made the basis of an application for official status as a local nature reserve (still under consideration). Previous visitors have included two past-presidents of the British Entomological and Natural History Society, but I was the first actually to represent this Society. My visit was from 1st–8th September 2012.

After a rapid and trouble-free journey by high-speed train, changing in Paris, Jennifer met me at the small provincial station of Montauban, 30km east of her home. I was a little apprehensive as the battered white van bumped down the rough track to the farmhouse, having been warned that the accommodation was simple, but behind the ancient wooden door and shutters of the cottage I found a luxurious home-from-home with every desirable comfort. The single-storey building, like most in the area with thick walls of yellow bricks and a red-tiled roof, consisted mainly of a single spacious bed/sitting room with twin beds, a well-lit writing desk and a variety of chairs, cupboards and shelves. The small kitchen, with refrigerator, gas stove and hot water on tap, occupied an extension at the back along with a tiny toilet and shower room. A door through the kitchen opened on a shady dell with a picnic table. A huge fig tree almost covered one side of the cottage, and the ripe figs were providing food for birds, hornets and many other insects. At the front was a verandah with covered seating from which one could watch tree frogs on the



Fig. 1. The farmhouse, Barrau Haumont, Esparsac, Tarn-et-Garonne, 2012. Photo: Clare Cole.

shrubbery and a carefully-sited clump of Michaelmas daisy attracting a succession of butterflies, bees, hoverflies and other insects.

I found that I could name all the butterflies by netting them and examining them closely in a butterfly viewing box, while referring to a most excellent book borrowed from Jennifer's library (Lafranchis, 2000). Many of the 24 species are also common in Britain, but the list also included both swallowtails, *Papilio machaon* L. and *Iphiclides podalirius* (L.), as well as *Lampides boeticus* (L.), the Long-tailed Blue, *Brintesia circe* (F.), the Great Banded Grayling, *Issoria lathonia* (L.), the Queen of Spain Fritillary, *Limenitis reducta* (Staudinger), the Southern White Admiral, and *Melitaea didyma* (Esper), the Spotted Fritillary.

Jennifer had arranged for a neighbour, a talented cook, to prepare evening meals at a reasonable price, so I was able to spend all my time studying insects. My main task was to survey the Orthoptera, for which there were no previous records. Most species would be adult in early September, so a list made at this time would be fairly complete. My list, with scientific and English names, is given below. Six grasshopper species were recorded, all common in southern France, although British readers might not be familiar with the chunky little *Pezotettix giornai* (Rossi), whose males ride on the backs of females, nor with the fat females and tooth-grinding male stridulation of *Calliptamus barbarus* (Costa) (Fig. 3). The bush-crickets were much more exciting as, one after the other, species appeared that I only knew from their pictures in books: *Tylopsis liliifolia* (F.), *Ruspolia nitidula* (Scopoli), *Yersinella raymondii* (Yersin). The long-winged green *Phanoptera nana* (Fieber) was quite common, and a large bush-cricket, *Uromenus rugosicollis* (Serville), conveniently came out to bask in the sun (Fig. 4). Its distinctive call of "squawk-squawk-squawk . . ." was heard at night and named from the recordings by Ragge and Reynolds (1998), as were the calls of three other bush-crickets. Without the bat-detector I



Fig. 2. The northern field, Barrau, and surrounding countryside. Photo: Clare Cole.

could hear none of these, but this made the song of *Oecanthus pellucens* (Scopoli), the Tree Cricket, all the more musical to my ears. Another call, like a free-wheeling bicycle, was heard from long grass in the daytime, but I was unable to trace it until I was accompanied one day by a neighbour, Clare Cole. Much younger and with good hearing, she managed to locate and photograph a specimen, which was *Decticus albifrons* (F.), a large relative of *D. verrucivorus* (L.), our Wart-biter, but brown and with pale marks. Perhaps the most significant find was *Cyrtaspis scutata* (Charpentier), a small green wingless member of the Meconematinae, apparently rare in France but probably under-recorded according to the national atlas of Orthoptera (Voisin, 2003). The distribution map shows few records from two areas, the mid-west and extreme south-east of France, 500 km apart, and the record from Barrau falls in the centre of this huge gap, although the atlas text does mention an unmapped record from the neighbouring *département* of Gers. I took three specimens home in order to study their habits, and all three fed on some dead insects but then went into hibernation without showing any courtship or mating behaviour. This species is a relative of *Meconema meridionale* (Costa), the Southern Oak Bush-cricket, which was also found and by the same method of beating the lower branches of oak trees. In Britain, and in other parts of northern Europe, this *Meconema* is a recent arrival and generally only found very locally in the parks and gardens of the urban environment. However, in the remote countryside of Barrau it was recorded at three separate locations, as was *C. scutata*, and this suggests that both species are here within their area of natural distribution.

My list of other insects is still in preparation, but it was a surprise to find that some of the most striking species were aliens of recent introduction. Prominent among them was the Asian hornet *Vespa velutina* Lepeletier, making a nuisance of itself at Barrau, as elsewhere, by attacking honeybees. It is somewhat smaller than the European hornet, *Vespa crabro* L., and largely black in colour, with yellow face and



Fig. 3. A female grasshopper *Calliptamus barbarus*, Barrau, 2012. Photo: Roger Hawkins.



Fig. 4. A male bush-cricket *Uromenus rugosicollis*, Barrau, Midi-Pyrénées, 2012. Photo: Roger Hawkins.

yellow band at end of abdomen. A large black sphecid wasp with stalked abdomen turned out to be *Isodontia mexicana* (Saussure), a recent arrival from America that preys upon just those crickets and bush-crickets that I was studying, although this was not observed. On my last evening a large soldierfly was captured indoors as it flew noisily around the light. It had long antennae, white-spotted abdomen and legs, and large green eyes patterned with thin dark bands and thus resembling those of a horsefly. This was *Hermetia illucens* (L.) (Stratiomyidae), the Black Soldierfly of North America (see Plate 4, Fig. 3). Two more American invaders were beaten from trees, both leafhoppers in a broad sense, *Stictocephala bisonia* Kopp & Yonke, the Buffalo Treehopper of family Membracidae, and *Metcalfa pruinosa* (Say), the Citrus Flatid Planthopper of family Flatidae.

Jennifer's generous offer, of free accommodation in return for a survey, is still open for the coming season. She does not allow the collecting of butterflies, or any collecting for purely selfish reasons, but is prepared to tolerate the taking of specimens as vouchers or for identification. The butterflies of Barrau have been well studied, as have the breeding birds, but the excellent and apparently comprehensive list of moths only covers those flying in late September. Nobody has yet surveyed the spiders or the hoverflies. Beetles have been covered, but only in May, while I, and several other visitors, have only made a tiny start on the true bugs and leafhoppers, the other families of flies, and the bees, wasps and ants. I plan to return myself during the coming season, but principally to list the wild flowers.

LIST OF ORTHOPTERA

Family Tettigoniidae – Bush-crickets

Phanoptera nana (Fieber). The commonest bush-cricket at Barrau, with adults regularly disturbed from bushes and trees, and then flying away. Many adults and nymphs sitting on a hedge of laurel (*Prunus laurocerasus*). Nymphs seen feeding on leaves of rose, and on the upper surface of laurel leaves.

Tylopsis liliifolia (F.). Two females (one yellow and one green), both among long grass.

Leptophyes punctatissima (Bosc) (Speckled Bush-cricket). One female seen on fig tree, and a male and two females beaten from oak.

Meconema meridionale (Costa) (Southern Oak Bush-cricket). One male and three females beaten from oak trees at three separate locations, often together with *Cyrtaspis scutata*.

Cyrtaspis scutata (Charpentier). Two males (green) and three females (one yellow and two green), all beaten from oak trees, at three separate locations.

Ruspolia nitidula (Scopoli). Two females found, low down in grass, but the strident song of the males could be heard at night at several places, with some being high up on bushes.

Tettigonia viridissima L. (Great Green Bush-cricket). None seen but two heard at night, from a bush and from an oak tree.

Decticus albifrons (F.). Distinctive song heard from long grass. One male seen.

Platycleis albopunctata (Goeze) (Grey Bush-cricket). None seen but song heard, both by day and at night, from bramble patches and from scrub.

Yersinella raymondii (Yersin). One male beaten from oak tree.

Uromenus rugosicollis (Serville). Two seen basking in sun, a brown female on top of the laurel hedge and a green male with white side-stripe on a nearby bramble leaf. The distinctive song of this species was heard at night from this spot, from the fig tree, and from various other places.

Family Gryllidae – Crickets

Nemobius sylvestris (Bosc) (Wood Cricket). Below oak trees on edge of wood.

Oecanthus pellucens (Scopoli) (Tree Cricket). Ubiquitous in trees and bushes, and calling most of the night.

Families Catantopidae and Acrididae – Grasshoppers

Pezotettix giornai (Rossi). Frequent in areas of short grass.

Calliptamus barbarus (Costa). Common in areas of short grass.

Omocestus rufipes (Zetterstedt) (Woodland Grasshopper). Common.

Chorthippus biguttulus (L.). Commonest grasshopper.

Chorthippus parallelus (Zetterstedt) (Meadow Grasshopper). At two locations.

Euchorthippus pulvinatus (Fischer de Waldheim). Common.

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SHORT COMMUNICATION

Further records of *Hylaeus pectoralis* Förster (Hymenoptera: Apidae) and *Gasteruption assectator* (L.) (Evaniodea: Gasteruptionidae) from Kent. – On 1.vii.2010 I reared a male *Hylaeus pectoralis* from an old gall of *Lipara lucens* Meigen (Diptera: Chloropidae) from Shorne in Kent (Jennings, 2011, *British Journal of Entomology and Natural History* **24**: 29). This species had not previously been reported from Kent (Allen, 2009, *Bees, wasps and ants of Kent*). Geoff Allen (*pers. comm*) advised me that Gerald Dicker, in the 1970s and early 1980s, had collected many *Lipara* galls from along the old, now derelict, Gravesend – Strood canal. As this is only 5km from Shorne, in July 2011, I decided to search along the canal for *Lipara* galls occupied by *H. pectoralis*. From galls collected along the canal at Chalk TQ6773 on 19.vii.2011 15 *H. pectoralis* emerged between 5–23.vii.2012. On 23.vii.2011 I found an occupied gall not far from the canal at Higham TQ7175. Three *H. pectoralis* emerged between 13–22.vii.2012. This suggests that *H. pectoralis* is a recent arrival in Kent, perhaps resulting from a southern expansion of the population in south Essex.

From a gall collected at Chalk one male *Gasteruption assectator* emerged on 5.vii.2012 and this was followed by a female on 18.vii.2012. From another gall a female *G. assectator* emerged on 20.vii.2012. These specimens were identified by reference to Crosskey, 1951, *Transactions of the Royal Entomological Society of London* **102**: 5, 247–301). Crosskey states that *G. assectator* had been previously recorded from Kent, is one of the commonest species of evanioids in Britain and has a wide host range within the solitary bees. *Gasteruption assectator* acts as cleptoparasite and predator, feeding on the host egg, food store and host larva – sometimes consuming the contents of more than one cell.

The specimens of *G. assectator* have been passed to Dr M. Shaw for inclusion in the collections at the National Museums of Scotland. – M. T. JENNINGS, 206 Lower Higham Road, Gravesend, Kent, DA12 2NN.

2012 ANNUAL EXHIBITION

Imperial College, London SW7 – 3 November 2012

The Society's Annual Exhibition was held in the Sherfield Building Imperial College, South Kensington. Exhibitors were allowed in from 10am on the day to arrange their exhibits and to put up display boards. Pemberley Books was allowed a stall so that members had the opportunity of buying a wide range of books on entomology and related natural history subjects. Other organisations present included Butterfly Conservation and Buglife. The doors were opened to members at 11am and there was quite a rush with over 200 members and friends attending (Figs 1 & 2).

The following accounts of the exhibits were compiled by the recorders: Aaron Jones (British Butterflies), Sean Clancy (British Macrolepidoptera), Richard Dickson (British Microlepidoptera), Colin Plant (Foreign Lepidoptera), Peter Chandler (Diptera), Peter Hodge (Coleoptera), Alan Stewart (Hemiptera), David Baldock (Hymenoptera) and John Badmin (Other Orders and General). This year the photography was a joint effort. Alex Harmer kindly agreed to be the official photographer on the day and set up his studio in a quiet corner near the main entrance of the exhibition room (Fig. 3). David Wilson kindly agreed to take the images and prepare the plates for the journal using the very latest software techniques. The joint operation was a complete success. The cost of printing the four colour plates in the journal was covered by a grant from the Hammond Memorial Fund.

The Society's Annual Dinner was once again held at the Strathmore Hotel, just off the Cromwell Road, close to the Natural History Museum and a short distance from the exhibition venue. Members who brought along exhibits were able to leave them in a secure room so that they could relax and chat in the bar beforehand (a very lively and noisy affair) and to enjoy Dinner in the hotel's main restaurant. In all, over 40 people packed into the room for a buffet style supper (Fig. 4). This year, A. J. (Tony) Pickles was finally able to attend and enjoy the festive occasion as President of the Society. He was accompanied by his beautiful wife, Cathy. At the end of the meal the President called upon us all to raise our glasses in honour of the Queen and the Society. Members then retired to the lounge for further discussions.

The whole organisation of the exhibition, the beer (and other refreshments) and the dinner was largely down to the efforts of Rosemary Hill to whom we offer our thanks. She was ably helped by Mike Simmons who put in a guest appearance to explain what needed doing, when, on the day. The two performed extremely well, with some additional help from members of Council. Due to the ever-increasing charges for the hire of the Senior Common Room at Imperial College, Council took the decision to move the venue elsewhere in 2013, so this is the last time the Annual Exhibition will be held at the College for the foreseeable future.

BRITISH BUTTERFLIES

BAILEY, K. E. J. – Results of breeding experiments during late 2011 and 2012. *Colias hyale* (L.), a specimen looking similar to *Colias alfacariensis* (Berger), two ab. *nigrofasciata* Grum-Grshimailo and an aberration lacking the usual hind-wing orange spot, from long cold shock, all from an F₂ generation bred from a female taken in Rumania, June 2012. *Colias alfacariensis*, a bred pair for comparison with *C. hyale*, together with a specimen with a minor aberration from a short cold shock to the pupa, all from a female taken Lot, France, August 2011. *Colias croceus* (Geoffroy), form *helice* Hübner, ab. *pseudomas* Cockerell, also a typically coloured ab. *nigrofasciata* Braun and an underside aberration, all from stock given short day



Fig. 1. Crowds at the 2012 Annual BENHS Exhibition. Photo: Tony Pickles.



Fig. 2. Three authors of recent books on British Lepidoptera, Sean Clancy, Phil Sterling and Paul Waring (centre rear). Photo: Tony Pickles.



Fig. 3. Alex Harmer photographing specimens for the colour plates. Photo: Tony Pickles.



Fig. 4. Enjoying the Annual Dinner at the Strathmore Hotel. Photo: Tony Pickles.

length and long cold shock, from an F₂ generation bred from a *helice* female taken Lot, France, August 2011. Another series of ab. *nigrofasciata*, two being extreme forms (Plate 1, Fig. 2), from long cold shock treatment of an F₂ generation reared from a Southern European female, February 2012. From the same stock a possible gynandromorph with predominantly male characteristics.

Polyommatus bellargus (Rott.), an F₂ brood from totally blue females taken Charente, France, September 2011. The F₁ females were all typical non-blue but the F₂ produced 100% totally blue females. The exhibitor believes these to have a similar inheritance to that of *Polyommatus coridon* (Poda), ab. *tithonus* Meigen. This is an interesting experiment, in the recorder's experience of British *bellargus*, the blue aberrations appearing to have no simple heritable basis; more study would prove interesting.

Aglais urticae (L.), extreme examples of ab. *semiichnusoides* Pronin from temperature shocks in raised oxygen levels from wild larvae, Charente, France, May 2012. *Boloria selene* (D. & S.), aberrations from temperature-shocked pupae from a female taken Charente, France, August 2011 (Plate 1, Figs 7 & 8). Similarly treated *Boloria euphrosyne* (L.), but showing less strong aberrant tendencies, from Gloucestershire stock. *Boloria dia* (L.), temperature-shocked aberrations similar to the *selene*, stock from Charente, France, May 2012. *Melitaea athalia* (Rott.), ab. *corythalia* Hübner, ab. *cymothoe* Bertolini and an unnamed aberration from cold-shocked pupae, all from F₂ stock, Charente, France May 2011.

Maniola Jurtina (L.), ab. *anticrassipunctata* Leeds, taken in Buckinghamshire, August 2012.

JONES, A. M. – *Pieris rapae* (L.), ab. *conjugata* Verity, a short series of female examples from an F₃ generation, September 2012, bred from a heavily marked female taken at Kingston upon Thames, Surrey, 8.ix.2011. The F₁ generation of 16 males and 15 females were all typical, the F₂ consisted of 11 males and 11 females, one female was an ab. *conjugata* and several others were slightly more heavily marked than normal. The F₃ generation comprised 15 type males, 11 heavily marked males, 9 type females and 20 heavily marked females with specimens ranging through ab. *conjuncta* Mezger, ab. *fasciata* Tutt and ab. *conjugata*. The heritability of this aberration seems unclear as has been seen by the exhibitor in other broods with offspring in the *fasciata* range. (Plate 1, Fig. 1).

Polygonia c-album (L.), two mixed gynandromorphs, these were reared in an F₁ generation from a very old West Sussex female taken 12.v.2012, the brood comprised 77 individuals, 7 f. *hutchinsoni* Robson males, 30 type males, 5 *hutchinsoni* females, 33 type females and the two gynandromorphs, emerging 28 & 29.vi.2012. F₂ and F₃ generations of 128 and 88, respectively were reared, but all were type (Plate 1, Fig. 3).

MASTERS, I. D. – Aberrations not previously exhibited. *Limenitis camilla* (L.), an aberration very close to ab. *nigrina* Weymer taken by R.J. Brooker at Rumbold's Farm, Plaistow, West Sussex (VC13), 14.vii.1979. Robert Brooker is the exhibitor's uncle and is now no longer active in entomology so his collection of voucher specimens has been amalgamated with that of the exhibitor.

Pyronia tithonus (L.) ab. *multiocellata* Oberthür, Bodmin Moor, Cornwall (VC2), 2.viii.1968, taken by the exhibitor.

REVELS, R. C. – *Aphantopus hyperantus* (L.), further breeding of ab. *lanceolata* Shipp. The stock originates from a female taken in 1996 by A.S. Harmer and given to the exhibitor in 1998. The strain has been maintained in a healthy state by out crossing *lanceolata* females every three years to wild males. In July 2010 a wild male ab. *arete* Müller was paired to a female *lanceolata*, this produced 30 typical butterflies in 2011, the F₂ offspring in 2012 comprised 86 type, 46 *lanceolata*, 15 *arete*

and 6 that were a mixture of *lanceolata* and *arete*. These results were slightly different to what was anticipated, the exhibitor believes that this may be due to one of the F₁ pairings not being between parents carrying the *arete* gene. The six combined aberrations were however much more extreme than any encountered before by A. E. Collier, A. S. Harmer or the exhibitor, in addition one of the *arete* was very heavily marked. (Plate 1, Figs 4–6).

WARING, P. – A note on a *Vanessa atalanta* (L.) taken in his Peterborough garden Robinson trap on 25 August 2012. September was a very good month for *V. atalanta* in the exhibitor's garden with a peak of nine on the 19 September seen simultaneously on a flowering ivy hedge. The trap is situated 50m away from the ivy out of direct view and is not set up until dusk and so it was assumed that the butterfly had flown in during the hours of dusk or darkness. The trap also contained two of the often migratory moth *Autograph gamma* (L.), but it is not clear whether the butterfly was on migration. This is the second or third time the exhibitor can recall having recorded *V. atalanta* in a moth-trap over the past thirty years.

BRITISH MACROMOTHS

BUTCHER, A. G. J. – From Barham, Kent (VC15), a striking aberration of *Cyclophora linearia* (Hübner) bred in 2012 from a similarly aberrant female taken in 2011 (Plate 2, Fig. 1), and a fine example of the melanic f. *nigra* of *Paradarisa consonaria* (Hübner) taken on 25.v.2012. From Grain, Kent (VC16) in 2012, species exhibited included examples of *Crocallis elingvaria* (L.) ab. *fusca* taken on 18.vii.; *Pelosia muscerda* (Hufner), 18.viii.; and *Trachea atriplicis* (L.) taken on 1.vii.

CLANCY, S. P. – Specimens of four species were exhibited that were determined during preparatory work for the new field guide 'Moths of Great Britain and Ireland', of which the exhibitor is the lead author. These specimens, from the collection of the exhibitor, were in the genera *Euxoa* and *Diachrysia* and sent to Laszlo Ronkay in Hungary for dissection and determination to species level. This resulted in the outcomes published in the Field Guide, shown in the exhibit, and as follows: *Diachrysia stenochrysis* (Warren, 1913) (= *tutti* Kostrowicki, 1961), three examples were confirmed to be this species and thus an addition to the British list, Dungeness, Kent, 9.vii.1992 (male, slide no. 10433), New Romney, Kent, 18.vi.1999 (male, slide no. 10437), Drumguish, nr. Kingussie, Inverness-shire, 29.vi.1999 (male, slide no. 10438) (Plate 2, Fig. 12); *Diachrysia chrysitis* (Linnaeus, 1758), three specimens were confirmed as this species and exhibited to show the overlap in external characters with the previous species, New Romney, Kent, 5.ix.2006 (female, slide no. 10434), New Romney, Kent, 19.vi.2002 (male, slide no. 10435), Greatstone, Kent, 7.ix.1989 (male, slide no. 10436); *Euxoa tritici* (Linnaeus, 1761) (= *crypta* Dadd, 1927), five specimens were confirmed to be this species and the first to be confirmed as British since recent changes in the taxonomy of this genus, four from Kent (VC15; Plate 2, Fig. 7) and one from Cornwall (VC1); *Euxoa eruta* (Hübner, [1817]), nine specimens were confirmed as this species (following the first UK records exhibited at the 2011 exhibition by P. Sterling) six from Kent (VC15), and singletons from Cornwall (VC1), Suffolk (VC26) and Morayshire (VC95). It was also commented that the species formerly known as *E. tritici* became *E. nigrofusca* in the new European taxonomy (previously thought to be the only species occurring in Britain), but confirmation of this species as British was not forthcoming from the specimens examined. The use of White-line Dart as the vernacular name for *Euxoa tritici* (Linnaeus, 1761) (= *crypta* Dadd, 1927) was considered appropriate as, whilst formerly this was thought to relate to the species now considered to be *nigrofusca*, at

least a high proportion (possibly all) of the UK examples of this species group refer to the two species now considered to be *tritici* (formerly *crypta*) and *eruta*, the latter now given the vernacular name of Dusky Dart.

CLARKE, J. H. – The usual varied and well-presented exhibit featuring examples of *Cyclophora ruficiliaria* (H.-S.) from Crawley Down, West Sussex, the first county record on 20.viii.2012; *Thera vetustata* (D. & S.) from Bridport, Dorset, the first UK record on 17.x.2006 (a rather worn example retrospectively identified and pre-dating the Sussex record from 2011 (Plate 2, Fig. 2); *Hyles livornica* (Esp.) from Dungeness, Kent, 4.vii.2012; *Senta flammea* (Curt.) from Filsham Reed Beds, East Sussex, 27.vi.2012; *Polymixis xanthomista* (Hübner.) from near Kennack, Cornwall, 15.ix.2012; *Tyta luctuosa* (D. & S.) from West Hythe, Kent, an example likely to be associated with a recently discovered Kentish colony, on 7.vii.2012; *Catocala fraxini* (L.), bred from a female caught in Orlestone Forest, Kent, 27.ix.2011; and *Pechipogo plumigeralis* (Hübner.) bred from a female caught at Cooden, East Sussex, 24.vii.2012.

COKER, K. J. – An exhibit featuring a number of aberrant specimens, mostly minor aberrations but including an unusual form of *Phragmatobia fuliginosa* (L.) with a yellowish tone to the hindwings and abdomen, from Wickham Common, Hants. (VC11), and a striking aberration of *Notodonta dromedarius* (L.) with a broadened and extended subterminal line, from the same site on 9.viii.2012 (Plate 2, Fig. 5).

COOK, R. R. – A series of *Utetheisa pulchella* (L.) bred from an immigrant female taken during autumn 2011 at West Bexington, Dorset, with some rearing notes.

DEANS, M. J. – A small selection of interesting species recorded in 2012 from East Suffolk (VC25): *Notodonta tritophus* (D. & S.), the fourth county record of this scarce immigrant, from Bawdsey, 18.viii.; *Euplagia quadripunctaria* (Poda), only the second county record, also from Bawdsey on 18.viii.; *Rhyacia simulans* (Hufn.), an example from Hollesley, 17.vii. (N. Mason); *Conistra rubiginea* (D. & S.), the third county record from Bawdsey, 18.x.2012; and *Spodoptera exigua* (Hübner.), one taken at Bawdsey, 23.x.2012.

DOBSON, A. H. – A varied exhibit of moths of interest recorded from VCs 3, 11, 12 and 21 that most notably included examples of *Cryphia algae* (F.) from Alder Valley, Gosport (VC11) on 4.viii.2012; *Lymantria dispar* (L.), one of two males taken at London Zoo (VC21) on 14.viii.2012 & 27.viii.2012; *Idaea degeneraria* (Hübner.) examples from Thatcher Point, Torquay (VC3) taken on 16.vii.2010 & 14.ix.2012; and *Leucochlaena oditis* (Hübner.) from Old Burghclere Lime Quarry, Torquay on 12.ix.2011 & 14.ix.2012, with comments that these constitute the first of this species from the Torquay area since 1947 and that 12 examples of the species were recorded on the latter date.

HARMER, A. S. – Bred examples of *Catocala fraxini* (L.) showing variation within this species, these having been bred from two females trapped thirty years apart in the exhibitor's garden trap in Lymington, Hampshire on 2.x.1981 and 17.x.2011.

HAYWARD, R. – A number of specimens of interest recorded from the exhibitor's garden in Wokingham Without, Berkshire in 2012, including *Euphyia biangulata* (Haw.) on 15.vii., and unusual forms of *Miltochrista miniata* (Forst.) taken on 7.viii. (Plate 2, Fig. 3) and *Drymonia ruficornis* (Hufn.) taken on 9.iv. (Plate 2, Fig. 4). Also shown were bred specimens of three species, *Rhodometra sacraria* (L.), *Orthonama obstipata* (F.) and *Lymantria dispar* (L.), exhibiting variation within each species.

HENWOOD, B. P. – A fascinating exhibit that included the third county record of the rare immigrant *Conistra erythrocephala* (D. & S.) from Abbotskerswell, Devon (VC3) on 24.ii.2012. Also bred examples of *Odontognophos dumetata* (Treitschke) and *Calamia tridens* (Hufn.) resulting from larvae found earlier during 2012 in the

Burren, Co. Clare (VCH9) with a comment that this represented the first time wild larvae of the latter species had been found and the first time the larval foodplant of *Sesleria caerulea* had been confirmed in the field. Also shown were bred examples of *Eupithecia abietaria* (Goeze) collected as larvae from a site in Dorset (VC9) during September 2010, with a comment that two moths emerged in 2012, thus overwintering twice. The exhibitor speculated that this was likely to be a survival strategy allowing a colony to persist through a season when there is a failure of the foodplant tree *Picea abies* to produce cones (as happened at the site in question in 2008).

HONEY, M. R. – A selection of species of local interest recorded from the London Wetland Centre, Barnes, Surrey that included examples of *Thera cupressata* (Geyer), *Lymantria dispar* (L.), *Naenia typica* (L.), *Elaphria venustula* (Hübner), and *Macrochilo cribrumalis* (Hübner).

JENKINS, A. – Examples of *Eriogaster lanestris* (L.) reared from a larval nest found at Tytherleigh, Devon in early August 2011; *Thaumetopoea processionea* (L.) reared from larvae found in Richmond, Surrey; the second British specimen of *Pseudeustrotia candidula* (D. & S.) from Chardstock, Devon, on 18.viii.2012 (Plate 2, Fig. 10) and see also details of the Owen and Palmer exhibits; dark examples of the recent colonist *Dryobotodes tenebrosa* (Esp.) bred from a female taken at Durlston, Dorset, in October 2011 (Plate 2, Fig. 11) and *Trigonophora flammea* (Esp.) taken near Eastbourne, Sussex.

KEMP, R. J. – A photographic exhibit showing larvae of *Lymantria dispar* (L.) feeding in a garden in Belvedere, London (VC16) on 24.vii.2012.

KNILL-JONES, S. A. – A selection of interesting species and forms taken in the exhibitor's garden at Totland, Isle of Wight, mostly during 2012. These included the following: *Cyclophora puppillaria* (Hübner) on the early date of 28.v.; *Eupithecia abietaria* (Goeze), the first VC10 record taken on 4.vii.; *Agrotis puta* (Hübner), a melanic female example taken on 4.ix. (Plate 2, Fig. 8); *Trachea atriplicis* (L.) taken on 17.viii.; and a bred series of *Catocala fraxini* (L.).

LANGMAID, J. R. – The fourth British specimen of *Callopietria juvenina* (Stoll) taken at Bracklesham Bay, Sussex (VC13) on 10.viii.2012 and exhibited on behalf of the captor D. Lee. From Southsea, Hants. (VC11) in 2012, an unusual aberrant example of *Agrotis ipsilon* (Hufner) (Plate 2, Fig. 6) taken on 22.viii.; and from the same site immigrant specimens of *Eupithecia abietaria* (Goeze) on 27.v., *Eilema caniola* (Hübner) on 31.vii., and *Macdunnoughia confusa* (Steph.) on 27.ix.

MASTERS, I. D. – From Middleton-on-Sea, Sussex (VC13), a number of species of local or national significance including a previously overlooked example of *Chrysodeixis chalcites* (Esp.) taken on 11.viii.1994, and details of 28 records of *Cyclophora puppillaria* (Hübner) recorded during 2012 indicating the presence of a local breeding population. Also shown were a number of previously unreported specimens of note taken by R. J. Brooker that included the seventh UK record of *Macaria signaria* (Hübner) from Haslemere, Surrey (VC17) on 6.vii.1987; from the same site probably the second VC17 record of *Spargania luctuata* (D. & S.) on 15.vi.1973; and *Cryphia algae* (F.) from Middleton-on-Sea on 27.vii.1996.

McCORMICK, R. F. – Species of interest recorded in Devon during 2012 by a number of recorders, although the specimens shown were not necessarily those recorded during the 2012 season. The most noteworthy of these were as follows: *Hyles livornica* (L.) a specimen representing the only county record since 2010, from Ashburton on 1.vii. (J. Barkham); *Xylota exsoleta* (L.), a presumed immigrant example taken at Membury on 28.ii. (O. Woodland), an exceedingly rare and occasional species throughout England in recent times; *Eublemma purpurina*

(D. & S.), the second county record from Stowford on 23.viii. (M. Braid); and *Macdunnoughia confusa* (Steph.), a specimen shown to represent the two county records in 2012, from Membury on 9.viii. (O. Woodland) & Hope Cove on 11.viii. (J. Chainey).

OWEN, J. – Four species from the exhibitor's garden near Dymchurch, Kent (VC15) that were recorded as new to the site in 2012: *Euplagia quadripunctaria* (Poda) on 14.viii., *Calophasia lunula* (Hufn.) on 27.v., *Conistra rubiginea* (D. & S.) on 24.x., and *Pseudeustrotia candidula* (Hübner) on 19.viii. (see also details of the Jenkins and Palmer exhibits); these bring the total number of macromoths recorded from this long-standing recording site to 532 species. Other species of note shown taken from the same site in 2012 were examples of *Pelosia muscerda* (Hufn.), an immigrant specimen taken on 20.viii., and the second site records of both *Hypenodes humidalis* (Doubt.) on 24.viii. and *Trisateles emortualis* (D. & S.) on 25.vii.

PALMER, R. – An examples of the scarce immigrant *Pseudeustrotia candidula* (D. & S.) taken in Findon Valley, near Worthing, Sussex, on 19.viii.2012 and exhibited on behalf of the captor M. Snelling. There were three examples of this species caught that night (with other records from Cornwall and Kent; see also details of the Owen exhibit), these closely following the second British record from Chardstock, Devon, the previous night (see details of the Jenkins exhibit).

PHILLIPS, J. W. – A varied exhibit that included examples of *Meganola strigula* (D. & S.) from Plashett Wood, Ringmer, Sussex, 17.vii.2012; and bred specimens of *Trigonophora flammea* (Esp.) from a female taken near Eastbourne, Sussex in 2011 where a resident population seems to have become established. Also shown were series of the sibling species *Noctua janthe* (Borkh.) and *Noctua janthina* (D. & S.) from Hayling Island, Hants (VC11); and a number of *Diachrysia* spp. from the same area, some of which showed the external characters of *D. stenochrysis* (Warren).

ROUSE, T. – An exhibit featuring two scarce immigrant species taken in the exhibitor's garden at Densole, Kent during 2012: *Actinotia polyodon* (Clerck) on 7.viii., and *Chrysodeixis chalcites* (Esp.) on 15.viii.

SCANES, J. – A single moth exhibit showing a fine example of the scarce immigrant *Acontia lucida* (Hufn.) taken in the exhibitor's garden at Bexhill-on-Sea, East Sussex, on 20.viii.2012.

SIMS, I. – An exhibit that included a number of species of interest from Rothamsted light-traps situated in Berkshire (VC22) and West Ross (VC105). These included *Hepialus fusconebulosa* (DeGeer) f. *shetlandicus* Viette from Beinn Eighe, Achnasheen on 27.vii.2012, and from the same locality during 2012 examples of *Eurois occulta* (L.) and *Hyppa rectilinea* (Esp.). Species of interest from Jealott's Hill, Berkshire included *Meganola albula* (D. & S.) on 22.vii.2012, and *Orthosia populeti* (F.) on 16–18.iii.2012.

Also shown was an example of filamentous fungal growth associated with the cocoon of *Cerura vinula* (L.) with a comment that the exhibitor had encountered similar occurrences with other Lepidoptera species recently, and speculation that this may be having a negative impact on insect numbers in prolonged damp climatic conditions.

SKINNER, B. F. – An asymmetrical aberration of *Cryphia algae* (F.) taken at Folkestone Warren, Kent, on 17.viii.2012 (Plate 2, Fig. 9).

TERRY, R. – Examples of 19 species of interest recorded in Middlesex and held in the exhibitor's collection. Most notable among these were the following: *Thera cupressata* (Geyer), the second county record from Barnet on 8.x.2011; *Philereme vetulata* (D. & S.) the second modern county record from Barnet, 5.vii.2012; *Deileptenia ribeata* (Clerck), an example thought to constitute the first county record from Potters Bar, 14.vii.2006; *Earias vitella* (F.) two wild-caught specimens

from Greenford, 24.vii.2006 (D. Howdon), and Wood Green, 2009 (M. Ashby); and the first county record of *Chrysodeixis chalcites* (Esp.) from Greenford, 14.viii.2004 (A. Culshaw).

TUNMORE, M. – From the Lizard (VC1) two examples of *Thysanoplusia orichalcea* (F.) taken on 26 & 29.ix.2012, and an example of *Chrysodeixis chalcites* (Esp.) taken on 2.vi.2012; from Kingsdown (VC15) a possibly immigrant example of *Lymantria dispar* (L.) recorded on 26.viii.2012.

BRITISH MICROLEPIDOPTERA

BEAUMONT, H. E. – *Ypsolopha lucella* (F.), West Melton, SE4101 approx., SW Yorkshire (VC63), 18.viii.2012, the only previous Yorkshire records are one from the mid-nineteenth century from 'York' that cannot now be allocated to a VC and a previous VC63 record in 2006; *Tachystola acroxantha* (Meyrick), Doncaster, SE50, SW Yorkshire (VC63), 24.v.2012, R.Moat leg., first Yorkshire and VC63 record; *Monochroa hornigi* (Staudinger), Bawtry Forest, SK6395 approx., SW Yorkshire, 27.vi.2012, previous Yorkshire records are restricted to single examples in VC63 at nearby Rossington in 1995 and 1997 and one in VC64 in 2011; *Mompha bradleyi* Reidl, Kirk Smeaton, SE5116, SW Yorkshire (VC63), 28.xi.2011, D. Williamson leg. and West Melton, SE4200, SW Yorkshire (VC63), 25.ii.2012, the first Yorkshire and VC63 records; *Acleris logiana* (Clerk), Hatfield Moors, SE6905, SW Yorkshire (VC63), 28.x.2010, this and another at nearby Goole are the first Yorkshire and VC63 records, though further single moths have since been recorded in VC63 in 2011 and VC61 in 2012; *Pseudococcyx tessulatana* (Staudinger) (Plate 3, Fig. 1), Bridlington, TA1866 approx., SE Yorkshire (VC61), 30.viii.2011, Leonora Bruce leg., taken at MV light in a coastal garden, though this moth is perhaps more likely to have been introduced with conifers, the larval foodplants, **new to Britain**, Yorkshire and VC61.

BEAVAN, Miss S. D. & HECKFORD, R. J. – *Rhigognostis senilella* (Zetterstedt), Ruinsival, Rum, North Ebudes NM355943 (VC104), larvae on *Arabidopsis petraea* 15.v.2012, moths reared 14.vi.2012, possibly a previously unrecorded larval foodplant. *Rhigognostis annulatella* (Curtis), near Cnapan Breaca, Rum, North Ebudes NM391971 (VC104), larva on *Arabidopsis petraea* 12.v.2012, moth reared 10.vi.2012; Ruinsival, Rum, North Ebudes NM355943 (VC104) larvae on *Arabidopsis petraea* 15.v.2012, moth reared 14.vi.2012. This is the second time that *T. annulatella* larvae have been found on this foodplant in the British Isles and in a mountainous area in the British Isles, as it is otherwise found on *Cochlearia officinalis* in coastal localities. *Biselachista eleochariella* (Stainton), Duartmore Burn, West Sutherland NC178370 (VC108), larva mining leaf of *Carex panicea* 8.v.2012, moth reared 1.vi.2012, new to VC108; also Harris, Rum, North Ebudes NM3495 (VC104) larva mining leaf of *C. panicea* 15.v.2012, moth reared 21.vi.2012 (genitalia determination). A previously unrecorded larval foodplant for this species. *Pancalia schwarzella* (F.), Braunton Burrows, Devon SS454352 (VC4), larvae on *Viola tricolor* ssp. *curtisii* 24.v.2012, moths reared 10 & 13.vii.2012, a previously unrecorded larval foodplant. *Scythris fallacella* (Schläger), Warton Crag, West Lancashire SD490726 (VC60), pupa and larva amongst *Helianthemum nummularium* 17.v.2012, moths reared 1.vi.2012 & 20.vi.2012, respectively. *Scythris empetrella* Karsholt & Nielsen, Cuthill Links, nr Dornoch, East Sutherland NH749867 (VC107), larvae on *Calluna vulgaris* 5.v.2012, moths reared 7 & 12.vi.2012. Second Scottish locality and new to VC107. *Celypha rufana* (Scopoli), Gait Barrows, West Lancashire SD4877 (VC60), larvae in spinings amongst dead leaves of *Potentilla sterilis* and *Fragaria vesca*

18.v.2012, and not on the roots or rootstocks of *Chrysanthemum vulgare* or *Artemisia vulgaris*, being the foodplants given in British literature; neither of these occurred where the larvae were found. Moths reared 10–21.vi.2012. Apparently the first time that larvae have been found in the British Isles. *Olethreutes schulziana* (F.), Coire an t-Sneachda, Cairngorm Mountains, East Inverness-shire NH9883903146 (VC96), larva on Trailing Azalea *Kalmia procumbens* 3.xi.2011, moth reared 25.ii.2012, a previously unrecorded larval foodplant. *Stenoptilia scabiodyctylus* (Gregon), Humphrey Head, Westmorland SD3973 (VC69) 19.viii.2012 (genitalia determination).

CLARKE, J. H. – *Nascia cilialis* (Hübner), Filsham Reed Beds, TQ7709 approx., St. Leonard's, East Sussex (VC14), 27.vi.2012, MV light-trap; *Phlyctaenia perlucidalis* (Hübner), Filsham Reed Beds, TQ7709 approx., St. Leonard's, East Sussex (VC14), 27.vi.2012, MV.

DEANS, M. J. – *Antigastra catalunalis* (Duponchel), Bawdsey Hall, TM347394, East Suffolk, 23.x.2012, MV, second area record.

DICKSON, R. J. – *Epiblema foenella* (L.), Wickham Common SU5810 South Hampshire (VC11) 25.vii.2012, leg. K.J.Coker, with the discal mark so reduced that its true identity took some time to elucidate; *Pammene obscurana* (Stephens), Orchard Copse SU5910 South Hampshire (VC11) 25.v.2012, very few Hampshire records; *Mompha divisella* Herrich-Schaffer, Fareham SU5707, South Hampshire (VC11), 7.v.2012, leg. K. J. Wheeler, scarce in Hampshire but probably spreading; *Mompha bradleyi* Riedl, Cams Bay, SU5905 South Hampshire (VC11), gall on great willowherb, *Epilobium hirsutum* 6.ix.2012; *Monochroa hornigi* (Staudinger), West Walk SU6012 South Hampshire (VC11) 13.vii.2012; *Bryotropha affinis* (Haworth), Titchfield Haven NNR SU5302 South Hampshire (VC11) 17.viii.2012, specimen superficially indistinguishable from *B. senectella*, detd gen.; *Syncopacma taeniolella* (Zeller), Horse Down SU0247 South Wiltshire (VC8) 20.viii.2012, aberration with no trace of the white fascia, detd gen..

DOBSON, A. H. – specimens from BENHS Field Meetings: *Batia lambdella* (Donovan), Bourley Heath nr Aldershot SU8450, North Hants (VC12), 14.vii.2012, MV, new to VC; *B. lambdella*, Hogmoor Inclosure nr Bordon SU7834, North Hants (VC12), 11.viii.2012, MV, second VC record; *Dioryctria sylvestrella* (Ratzeburg), Hogmoor Inclosure nr Bordon SU7834, North Hants (VC12), 11.viii.2012.

Coleophora sternipennella (Zetterstedt), Old Down, Basingstoke & Dean Council Open Space, SU5948, North Hants (VC12), 5.viii.2011, at MV light, genitalia determination by J. Clifton, second VC record; *Cosmopterix orichalcea* Stainton, Old Down, Basingstoke & Dean Council Open Space, SU5948, North Hants (VC12), 2.vi.2011 at MV, determined by Dr. J. R. Langmaid, second VC site, previous records are only from Leckford on *Phalaris arundinacea*, common reed, but the only possible foodplant at this site would be *Anthoxanthum odoratum*, sweet vernal grass, but mines are yet to be found; *Cnephasia pumicana* (Zeller), Old Down, Basingstoke & Dean Council Open Space, SU5948, North Hants (VC12), 5.viii.2011, genitalia determination J.Clifton; *Coleophora therinella* Tengstrom, Brighton Hill, Basingstoke, SU6249, North Hants (VC12), 17.viii.2012, MV, genitalia determined by J. Clifton, second VC record; *Cnephasia genitalana* Pierce & Metcalfe, Brighton Hill, Basingstoke, SU6249, North Hants (VC12), 31.vii.2011, MV, genitalia determination by J. Clifton, a very small example with no markings; *Cydia amplana* (Hübner), Brighton Hill, Basingstoke, SU6249, North Hants (VC12), 17.viii.2012, MV, second VC record; *Homeosoma nebulella* (D. & S.), Thatcher Point, Torquay, SX9463, South Devon (VC3), 26.v.2011, one flying along coastal path at dusk, fourth Devon record; *H. nebulella*, North Solent NNR nr Lepe, SZ4297, South Hants (VC11), 26.vii.2012, at MV; *Agonopterix scopariella* (Heinemann), Silchester, SU6262, larva on *Cytisus*



PLATE 1. Fig. 1: *Pieris rapae* ab. *conjugata*, (F₃), Kingston, Surrey, ix.2012, A. M. Jones. Fig. 2: *Colias croceus* ab. *nigrofasciata*, female, temperature experiment (long cold shock), K. Bailey. Fig. 3: *Polygonia c-album*, mixed gynandromorph, bred 28.vi.2012, West Sussex, A. M. Jones. Figs 4–6: *Aphantopus hyperantus*, bred 2012, R. Revels, (4) ab. *arete* Müller + *lanceolata* Shipp; (5) ab. *lanceolata*; (6) ab. *arete*. Figs. 7 & 8: *Boloria selene*, temperature experiments, K. Bailey.



PLATE 2. Fig. 1: *Cyclophora linearia*, bred 2012 ex female Barham, Kent, 2011, A. G. J. Butcher. Fig. 2: *Thera vetustata*, (first UK record), Bridport, Dorset, 17.x.2006, J. H. Clarke. Fig. 3: *Miltochrista miniata*, Wokingham Without, Berkshire, 7.viii.2012, R. Hayward. Fig. 4: *Drymonia ruficornis*, Wokingham Without, Berkshire, 9.iv.2012, R. Hayward. Fig. 5: *Notodonta dromedarius*, Wickham Common, South Hampshire, 9.viii.2012, K. J. Coker. Fig. 6: *Agrotis ipsilon*, Southsea, South Hampshire, 22.viii.2012, J. R. Langmaid. Fig. 7: *Euxoa tritici* (= *crypta*) (female), Dungeness, Kent, 14.vii.1997, S. P. Clancy. Fig. 8: *Agrotis puta* (melanic form), Totland, Isle-of-Wight, 4.ix.2012, S. A. Knill-Jones. Fig. 9: *Cryphia algae* (asymmetrical form), Folkestone, Kent, 17.viii.2012, B. Skinner. Fig. 10: *Pseudeustrotia candidula*, Chardstock, Devon, 18.viii.2012, A. Jenkins. Fig. 11: *Dryobotodes tenebrosa* (dark example), bred 2012 ex female Durlston, Dorset, October 2011, A. Jenkins. Fig. 12: *Diachrysia stenochrysis* (male). Drumguish, Inverness-shire, 29.vi.1999, S. P. Clancy.

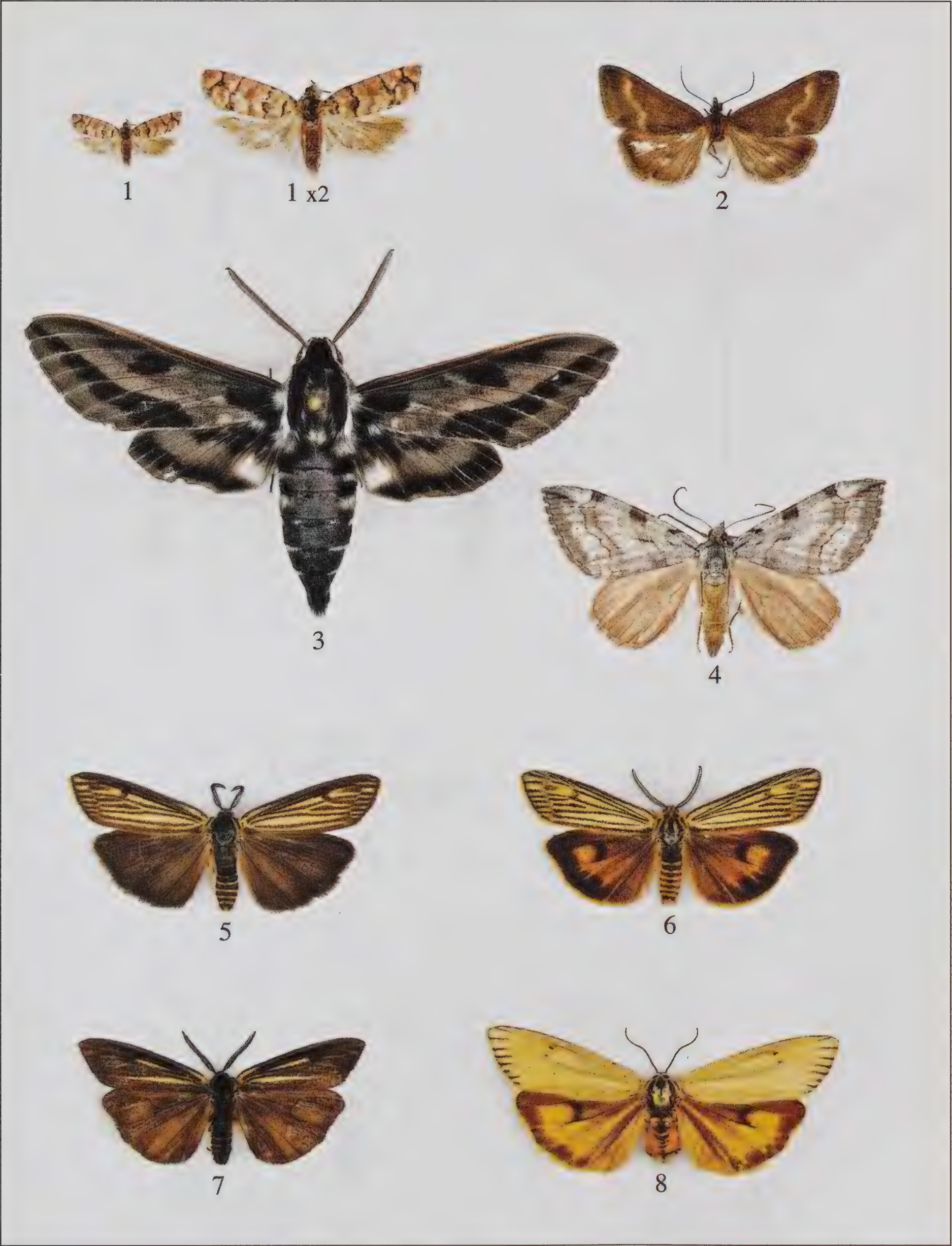


PLATE 3. Fig. 1: *Pseudococcyx tessulatana*, new to Britain, 30.viii.2011, Bridlington, South-east Yorkshire, L. Bruce, exhibited by H. E. Beaumont. Fig. 2: *Pyrausta aerealis*, new to Britain, Dibgate Quarry, Cheriton, Kent, 24.ix.2012, T. Steele. Fig. 3: *Hyles dahlia* (melanic form), Parc Natural de s'Albufera, Mallorca, 23.ix.2012, M. Honey. Fig. 4: *Aplocera vivesi*, Binifaldó, Mallorca, 7.v.2010, M. Honey. Figs. 5–8: *Spiris slovenica*, A. Pickles, (5 & 8) Pliskovica, Marenca, Slovenia, 7.vi.2003 & 1–4.vi.2003; (6 & 7) Otòsče, Slovenia, 1–4.vi.2003.

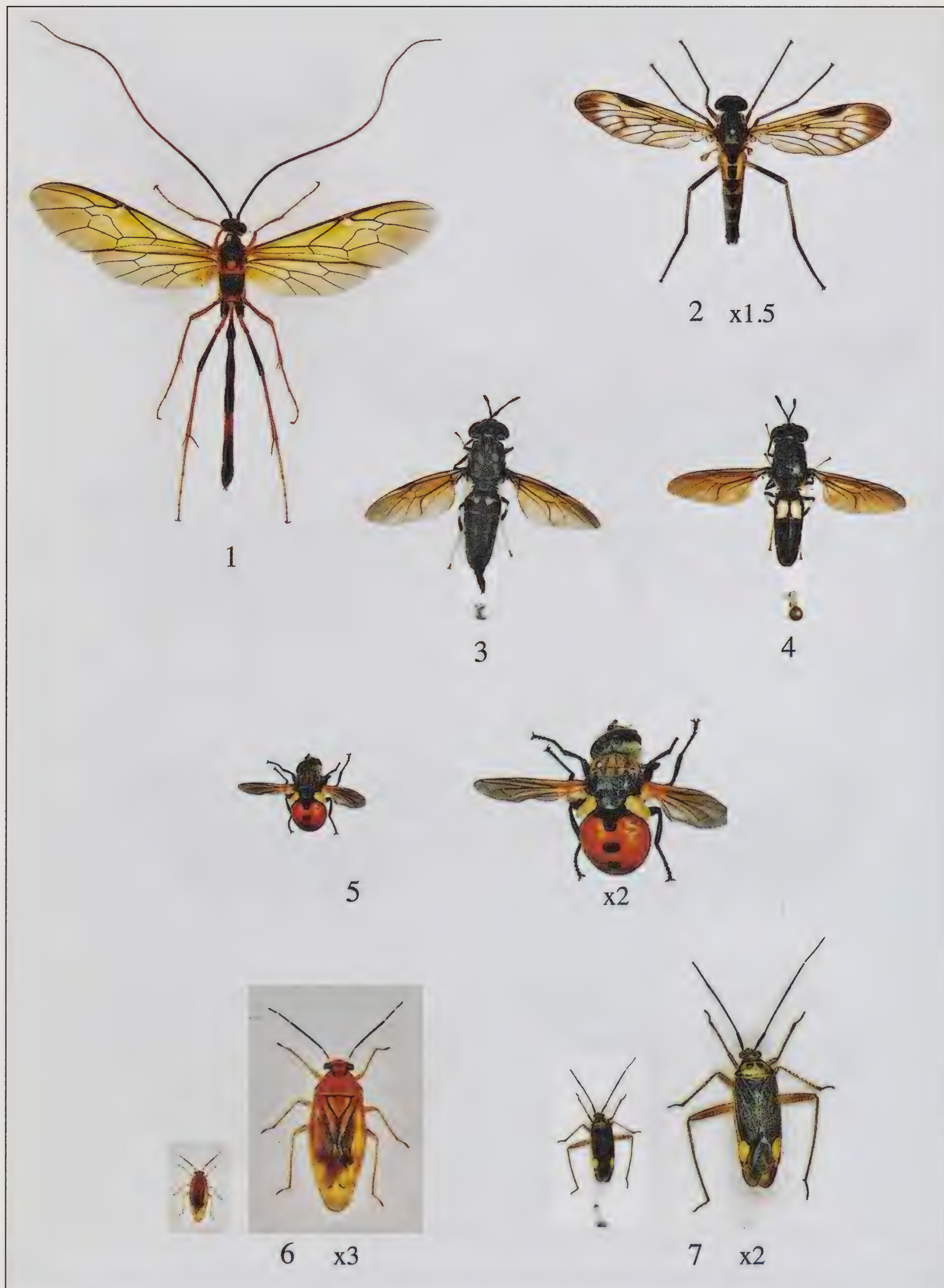


PLATE 4. Fig. 1: *Stauropoctonus bombycivorus*, Botley Wood, South Hampshire, 14.viii.2012, K. Wheeler. Fig. 2: *Rhagio strigosus*, Warburg Reserve, Oxon, 18.viii.2012, I. Perry. Fig. 3: *Hermetia illucens*, Tarn-et-Garonne, Houmont, France, 7.ix.2012, R. Hawkins. Fig. 4: *H. illucens*, Sri Lanka, Galaha, 27.ii.1974, P. Chandler. Fig. 5: *Gymnosoma rotundatum*, Southwater Country Park, West Sussex, 15.ix.2012, K. Merrifield. Fig. 6: *Tropidosteptes pacificus*, Alexandra Park, London, 11.vi.2012, T. Bantock. Fig. 7: *Closterotomus trivialis*, east shore of Lake Windermere, 12.vi.2012, J. Flanagan.

scoparius 19.vi.1996, moth bred (record previously not accepted, but verified this year by Dr. J. R. Langmaid) second VC record. *Zelleria hepariella* Stainton, Kempshott, Basingstoke, SU5949, North Hants (VC12), light trap, 2.iv.2006, leg. G. A. Henwood, detd gen J. Clifton & Martin Honey. Specimen had a two-tone appearance. Although there are examples in the NHM, none to the degree shown here. *Platyedra subcinerea* (Haworth), Kempshott, Basingstoke, SU5949, North Hants (VC12), light trap, 24.v.2012, leg. G. A. Henwood, gen. det. J. Clifton, second VC record; *Epiphyas postvittana* (Walker), Kempshott, Basingstoke, SU5949, North Hants (VC12), light trap, 10.xi.2011, leg. G. A. Henwood, gen. det. J. Clifton as the specimen was very oddly marked; *Gypsonoma dealbana* (Frölich), Kempshott, Basingstoke, SU5949, North Hants (VC12), light trap, 26.vi.2011, leg. G. A. Henwood, gen. det. J. Clifton, melanic example; *Cydia amplana* (Hübner), Kempshott, Basingstoke, SU5949, North Hants (VC12), light trap, 12.viii.2012, leg. G. A. Henwood. The first VC record and possible evidence of a northward extension of range of this species.

HENWOOD, B. – *Pammene aurana* (F.), Slapton Ley, SX8243, South Devon (VC3), bred in 2012 ex larva on *Heracleum sphondylium* L., hogweed, 11.vii.2010, thus overwintering twice; *Cydia amplana* (Hübner), Berry Head, SX9356, South Devon (VC3), 14.viii.2012, MV; *Chrysoesthia drurella* (F.), Abbotskerswell, SX8668, South Devon (VC3), 30.v.2012, flying by day; *Cosmopterix lienigiella* Lienig & Zeller, Exminster Marshes, SX9857 approx., South Devon (VC3), larva on *Phragmites australis* (Cav.), common reed, bred 24.vi.2012, from the same site where the first county record was obtained by B. Bewsher on 1.vi.2011; *Mompha divisella* Herrich-Schäffer, Abbotskerswell, SX8668, South Devon (VC3), larva in *Epilobium parviflorum* (Schreb.), hoary willowherb, bred 29.viii.2012; *M. divisella*, Newquay, SW8161, West Cornwall (VC1), larva in *Epilobium tetragonum* L., square-stalked willowherb, bred 10.ix.2012; *Mompha bradleyi* Riedl, Abbotskerswell, SX8668, South Devon (VC3), 15.x.2011, at kitchen window, confirmed by dissection, new to Devon; *M. bradleyi*, also Abbotskerswell, pupae in *E. hirsutum* L., great willowherb, leg. PH Sterling, bred 17.ix.2012; *Euzophera bigella* (Zeller), Newquay, SW8161, West Cornwall (VC1), larva in pomegranate bought in supermarket, bred 22.iii.2012.

HONEY, M. R. – Some new site records and interesting species recorded at the London Wetland Centre, TQ2276, Barnes, Surrey (VC17) in 2012. *Phyllocnistis saligna* (Zeller)(not yet gen det'd); *Opostega salaciella* (Treitschke), the most northerly record for Surrey, 26.vi.2012; *Orthotelia sparganella* (Thunberg), a good record for northern Surrey; *Cochylis molliculana* Zeller, several examples of this expanding species; *Acleris literana* (L.), very local Surrey species; *Endothenia quadrimaculana* (Haworth), a good Surrey record.

KNILL-JONES, S. – Moths from Totland, SZ3286, Isle of Wight (VC10): *Cochylis atricapitana* (Stephens), 1.vi.2012; *Crociosema plebejana* (Zeller), 19.x.2012; *Cydia amplana* (Hübner), 26.viii.2012; *Acleris kochiella* (Goeze), 25.vii.2012; *Amblyptilia acanthodactyla* (Hübner) a series taken in 2012; *Apomyelois bistriatella* (Ragonot), 4.ix.2012; *Endotricha flammealis* (D. & S.), 22.vii.2012; *Udea fulvalis* (Hübner), 14.viii.2012; *Evergestis extimalis* (Scopoli), 13.viii.2012; *Agriphila tristella* (D. & S.), 18.viii.2012.

LANGMAID, J. R. – *Coleophora clypeiferella* Hofmann, Southsea, SZ6598, South Hampshire (VC11), 10.viii.2012, one of two taken in August 2012, a rare species in Hampshire; *Cydia amplana* (Hübner), Southsea, SZ6598, South Hampshire (VC11), 24.viii.2012, one of many recorded in August 2012 in Southsea; *Agriphila tristella* (D. & S.), Portchester, SU6005, South Hampshire (VC11), 21.viii.2012, Jon Stokes leg., a remarkable aberration lacking the longitudinal streak on the forewing.

LOWE, N. R. (Brecknock Moth Group) – Lepidoptera from VC42 Breconshire. *Caloptilia azaleella* (Brants), Crickhowell, SO2118, 18.viii.2012, new to VC; *Oegoconia quadripuncta* (Haworth), Crickhowell, 10.viii.2012, leg. S. Furber, new to VC; *Coleophora spinella* (Schränk), Llangorse, SO1327, 8.viii.2012, N. R. Lowe leg., first adult record for VC; *Donacaula forficella* (Thunberg), Legar SO2117, viii.2012, J. M. & P. M. Rees leg., second VC record and first since 1988. *Philedonides lunana* (Thunberg), Mynydd Llangorse, SO1526, 21.iii.2012, flying in one of the few warm spells of 2012, N. R. Lowe leg..

A selection of *Yponomeuta* species from Breconshire with tentative identification, all by N. R. Lowe – *Y. padella* (L.), Llangorse, SO2118, 8.viii.2012; *Y. malinellus* Zeller, Llangorse, SO1327, 29.vii.2011; *Y. rorrella* (Hübner), Llangorse, SO1327, 29.vii.2011; *Y. cagnagella* (Hübner), Llangorse, SO1327, 29.vii.2011; *Y. plumbella* (D. & S.), Llangorse, SO1327, 21.viii.2012, two taken adjacent to webs on spindle, with an apparently more typical specimen from Bosherton, SR9634, Pembrokeshire (VC45).

MASTERS, I. D. – new records from Middleton-on-Sea, SU982004, West Sussex (VC13): *Evergestis limbata* (L.), 25.vii.2012; *Aphomia zelleri* (Joannis), 27.vii.2012; *Donacaula forficella* (Thunberg), 27.vii.2012; *Acleris literana* (L.), 7.viii.2011, all at MV light-trap.

MCCORMICK, R. F. – Significant Devon records for 2012 (the specimens shown were not necessarily the ones seen or taken), *Cydia amplana* (Hübner) Teignmouth, SX9373, South Devon (VC3), 15.viii.2012; also Hope Cove, SX6739, South Devon (VC3), 9–11.viii.2012, A. Cheyney leg., (several others have been seen this year); *Evergestis extimalis* (Scopoli), Holcombe nr Teignmouth, SX9574, South Devon (VC3), 17.viii.2012, fifteen records since 1985; *Diplopseustis perieresalis* (Walker), Tiverton, SS9512 approx., South Devon (VC3), 2.ix.2012, A. Cunningham leg. (first seen at Exeter, 4.xi.2007, G. & J. Jarvis).

OWEN, J. – *Psammotis pulveralis* (Hübner), Dymchurch, TR0731, East Kent (VC15), 7.viii.2012, MV, a regular visitor from 1998 until 2005, first record since; *Ceutholopha isidis* Zeller, Pyralidae (Phycitinae), Dymchurch, 18.viii.2012, MV, genitalia determined by Martin Honey, **new to Britain**. In Europe, known from Malta and Corsica, also in Africa and south Asia, feeding on *Acacia nilotica*.

PALMER, S. M. & C. A. – A display describing the new Gelechiid Recording Scheme (covering the British Isles and Channel Islands), its aims, how to participate, and some early distribution maps at 10 km level from the 67,000 records received by mid October 2012. Contributors to the Scheme are requested to send in records via their County/Vice County Moth Recorder wherever possible or direct to Stephen and Carolyn Palmer via email to s.palmer12@btopenworld.com or to 137 Lightfoot Lane, Fulwood, Preston, Lancashire PR4 0AH.

SIMPSON, A. N. B. – *Choristoneura diversana* (Hübner), Slade Wood, SP024540, Worcestershire (VC37), 7.vii.2012, two of three moths disturbed from dense woodland, first VC record since 1882; *Platyedra subcinerea* (Haworth), Aldeburgh, TM4635558, Suffolk (VC25), bred ex larvae feeding on flowers and seeds of *Malva sylvestris* L., common mallow, 13.vii.2012; *Chrysoclista lathamella* Fletcher, Highwood-Eastham, SO653669, Worcestershire (VC37), 23.vi.2012, found on a leaf in his garden, leg. Ken Willets, first VC record; *Digitivalva perlepidella* (Stainton), Broadway Quarry, SP116368, Worcestershire (VC37), 8.v.2012, leg. Oliver Wadsworth, first VC record.

SIMS, I. – *Tinea semifulvella* Haworth, adult to Rothamsted light-trap 527, Beinn Eighe II, NG9759 approx., Achnasheen, West Ross, Scotland, 9.vii.2012, believed to be the second record for VC105 (Brian Neath, *pers. comm.*); *Parectopa ononidis*

(Zeller), Jealott's Hill, SU8673, Berkshire (VC22), 13 & 14.viii.2012, two of three trapped this year, and third to sixth Berkshire records (Martin Harvey, *pers. comm.*); *Depressaria daucella* (D. & S.), Dinton Pastures, Hurst, Reading SU7871, Berkshire (VC22), larvae on hemlock water dropwort, *Oenanthe crocata* L. flowers 28.v.2012, bred 28.vi.2012, exhibited with spun flowers and pupae; *Depressaria pastinacella* (Duponchel), Medmenham, Marlow, SU8184, Buckinghamshire (VC24), larvae on flowers of hogweed, *Heracleum sphondylium* L., 20.vii.2001, bred 9.viii.2001; *Depressaria chaerophylli* Zeller, Jealott's Hill, SU8673, Berkshire (VC22), larva on wild carrot, *Daucus carota* L., 11.vi.2011, bred 21.vi.2011; *Agonopterix heracliana* (L.), Jealott's Hill, SU8673, Berkshire (VC22), larvae on flowers & leaves of cow parsley, *Anthriscus sylvestris*, 15.v.2009, bred 30.v.2009; *A. purpurea* (Haworth), Moor Green Lakes, SU8062, Finchampstead, Berkshire (VC22), larvae on leaves of rough chervil, *Chaerophyllum temulentum* L., 9.vii.2011, bred 3.viii.2011; *A. alstromeriana* (Clerk), Hainault Forest, TQ4793, Chigwell Row, South Essex (VC18), larvae on flowers and leaves of hemlock, *Conium maculatum* L., 29.v.2011, bred 30.vi.2011; also Jealott's Hill, SU8673, Berkshire (VC22), same foodplant, 6.vi.2012, bred 20.vi.2012; *A. arenella* (D. & S.), Jealott's Hill, SU8673, Berkshire (VC22), larvae on leaves of spear thistle, *Cirsium vulgare* (Savi), 8.vii.2010, bred 23.vii.2010; also at the same site on burdock, *Arctium* sp., 15.vii.2011, and at Dinton Pastures, Hurst, Reading SU7871, Berkshire (VC22), larvae on leaves of meadow knapweed, *Centaurea jacea* L., 25.vi.2009, bred 8.vii.2009; *A. kaekeritziana* (L.), River Lodden, approx. SU7569, Lower Earley, Reading, Berkshire (VC22), larva spun on gorse, *Ulex europaeus* L., 28.v.2009, bred 14.vi.2009; *A. ocellana* (F.), Dinton Pastures, Hurst, Reading SU7871, Berkshire (VC22), larva on white willow, *Salix alba* L., 8.v.2011, bred 6.vi.2011; also from Moor Green Lakes, Finchampstead, Berkshire (VC22), larva on leaves of willow, *Salix* sp., 9.vii.2011, bred 5.viii.2011; *A. liturosa* (Haworth), Hambleden, Marlow, SU7886, Buckinghamshire (VC24), larvae spun in tips of perforate St. John's wort, *Hypericum perforatum* L., 20.vi.1991, bred 13.vii.1991; also from Bank Hill near Malvern, Herefordshire (VC36), 24.vi.1979, bred 1.vii.1979; *A. conterminella* (Zeller), Dinton Pastures, Hurst, Reading SU7871, Berkshire (VC22), larva on leaves of willow, *Salix* sp., 5.v.2011, bred 25.v.2011; *A. angelicella* (Hübner), Watermans Bridge, SS4415, Langtree, North Devon (VC4), larva on leaf of angelica, *Angelica sylvestris* L., 6.vi.1989, bred 24.6.1989; *A. capreolella* (Zeller), Dinton Pastures, Hurst, Reading SU7871, Berkshire (VC22), pupae on leaves of rough chervil, *Chaerophyllum temulum* L., 28.vi.2009, bred 18.vii.2009.

STEELE, A. – *Pyrausta aerealis* (Hübner) (Plate 3, Fig. 2), Dibgate Quarry, Cheriton, TR180368, East Kent (VC15), 23.vi.2012, MV, detd gen. Brian Goodey. The site is part of the MoD St. Martins Plain / Dibgate Camp complex. **New to Britain.**

STERLING, M. – species from his garden in St. Albans's, TL1607, Hertfordshire (VC20) first seen in 2012: *Evergestis extimalis* (Scopoli), *Loxostege sticticalis* (L.), *Ostrinia nubilalis* (Hübner), *Spoladia recurvalis* (F.), *Cydia amplana* (Hübner), *Hellula undalis* (F.) and *Uresiphita polygonalis* (F.).

STERLING, P. H., HENWOOD, B. P. & FOOT, D. – from a trip to The Burren, Co. Clare, Ireland (VCH9). *Argyresthia abdominalis* Zeller, Knockycallanan, Oughtmama, 13.vi.2012, smoked from juniper, *Juniperus communis* L., new to Ireland; *Biselachista albidella* Nylander, Cooiloorta, mines in great fen-sedge, *Cladium mariscus* (L.), 15.vi.2012, emerged vii.2012, genitalia checked, new foodplant record; *Epinotia rubiginosana* (Herrich-Schäffer), Knockycallanan, Oughtmama, 11.vi.2012, at MV, third record for Ireland; *Leucoptera orobi* (Stainton), Turlough Hill, 12.vi.2012, adults and mines on bitter vetch, *Lathyrus linifolius*, first recent record from Ireland;

Syncopacma cinctella (Clerk), Knockycallanan, Oughtmama, 11.vi.2012, two of many examples at light, genitalia checked; *Cochylimorpha straminea* (Haworth), Knockycallanan, Oughtmama, 11.vi. & 13.vi.2012, at MV, one example showing the paired blackish scale-tufts characteristic of *C. alternana* (Stephens), but genitalia checked to confirm *C. straminea*; *Scoparia ambigualis* (Treitschke), Poulcoin, 11.vi.2012, at MV; also Glen of Clab, 12.vi.2012, at MV, whitish examples resembling *S. ancipitella* (La Harpe), but genitalia checked to confirm *S. ambigualis*.

FOREIGN LEPIDOPTERA

HONEY, M. R. – Some unusual Mallorcan moths from recent fieldtrips (aka holidays). (1) *Hyles dahlia* (Geyer) Sphingidae, Smoky Spurge Hawkmoth – an un-named aberration, almost completely suffused with black, Mallorca, Parc Natural de s'Albufera, Sa Roca, 23.ix.2012, (Plate 3, Fig. 3), exhibited alongside a normally coloured specimen); (2) *Antheraea pernyi* (Guérin-Méneville), Saturniidae, Chinese Oak Silkmoth, one of five specimens that came to light one night at a site in the mountains of Mallorca – part of a population established after a failed attempt at a silk industry on Mallorca in the 19th century); (3) *Aplocera vivesi* Expòsito (Geometridae) (Plate 3, Fig. 4), a Mallorcan endemic that, prior to 2012, was known from just two male specimens. Between 2010 and 2012 the exhibitor trapped a short series (two in May 2010, two in April 2011 and one in April 2012) that have now been confirmed by dissection as specimens of this species, including an example (not exhibited) of the first known female.

PICKLES, A. J. – (1) *Arctia flava* (Fuessly), Erebidae, Arctiinae – two specimens from the Albula Pass, Graubünden at 2300m on 27 July 2012, together with photographs illustrating the living moth and locality. In Europe, this is an Alpine species occurring at an altitude of up to 3000m and exhibiting considerable intra-population variation. It is found in xeric montane areas inhabiting steep rocky slopes, pebbles and ravines. The larvae, which overwinter twice are polyphagous on the sparse low herbs and shrubs. The exhibitor had failed to find this species in France, but it seems relatively abundant in Eastern Switzerland. (2) *Spiris slovenica* (Daniel) compared to *Spiris striata* (L.), Erebidae, Arctiinae, from France. Specimens of *S. slovenica*, taken on the BENHS field trip to Slovenia (Otòsè. 14.034E 45.765N, 490m, 1–4.vi.2003 leg. A. J. Pickles) in May and June 2003, but not recognised until this year (Plate 3, Figs 5–8). Exhibited alongside two specimens of *S. striata* from French localities, for comparison. The species was originally named as a subspecies of *striata*, and it was not until 2011 that an investigation of genitalia demonstrated clear separation at species level. *Spiris slovenica* is confined to hilly areas in Slovenia and Croatia while *striata* has a Euro-Siberian distribution and is widespread in Europe. The need to retain specimens is demonstrated once more. (3) *Enterpia laudeti* (Boisduval), Noctuidae, Hadeniinae, two examples reared from larvae above St Crepin, Hautes-Alpes, France, collected from *Silene otitis* (L.) Wibel, growing at about 1500m, 27 July 2011 and adults emerged 29.vi.2012. This species is found in small, isolated and disjunct areas in Spain, the South West Alps, the Balkans and the northern Turkish mountains, usually in rocky localities at medium high altitudes. The larvae were conspicuous in the evening in late July. The exhibit was accompanied by two photographs of the distinctive larvae. (4) Alpine species of *Apamea* Ochsenheimer compared to our single species from Scotland which is now reassigned from *Apamea assimilis* (Doubleday) to *Apamea exulis* Lefèbvre. (a) Photographs of living *Apamea zeta* (Treitschke) (Noctuidae) and localities at Col du Galibier, 2645m and Col du Lauzet, 2175m, both in Hautes-Alpes, France; (b) Four

specimens of *Apamea exulis* (Lefèbvre) (formerly treated as *A. zeta assimilis* (Doubleday) from Mid Perth, Scotland, August 1996; (c) Two specimens of *Apamea exulis* (Lefèbvre) from Shetland, July 2006 (formerly treated as *A. zeta marmorata* (Zetterstedt). The name of this species has changed many times. In Skinner (2009, Colour Identification Guide to Moths of the British Isles. Apollo Books. p156) it appears as *A. zeta marmorata* (Zetterstedt) in Shetland and ssp. *assimilis* (Doubleday) in the Highlands; in Zilli *et al.* (Zilli, A, Ronkay, L & Fibiger, M., 2005. Noctuidae Europaeae, Vol 8. Entomological Press. p155) it appears as *A. assimilis* (Doubleday). At one time, the populations in Shetland and the Scottish Highlands were considered to be distinct, but molecular data shows them, as well as the population found in the Faroe Islands (formerly *A. assimilis* ssp. *jenkjeldi* Fibiger, Ronkay & Zilli), to have the same identity. The habitus of *jenkjeldi* varies from forms similar to those from the Scottish Highlands to remarkably striped forms. The species is found on peaty moorland where the larva is suspected to feed on moorland grasses. The Faroe Island population is associated with semi tundra areas; (d) *Apamea platinea* (Treitschke), two specimens from Hautes-Alpes, Col du Lauzet, 2175m, France, 19–20.vii.2012. An inhabitant of dry, rocky mountain slopes in mid to high altitudes and always in the more xeric areas of the mountains; (e) *Apamea zeta* (Treitschke), specimens illustrating the range of variation from July 2012, France, Hautes-Alpes, Col du Lauzet, 2175m and Albula Pass, Graubünden, Switzerland at 2300m. This is a montane species which is found exclusively at high altitudes, rising to 3000m in the Alps. It is abundant on rocky slopes and very variable; (f) *Apamea rubrireana* (Treitschke), two specimens from Haute Savoie, Le Tour above Chamonix, 1500m, France, July 2007. A species found at high altitudes in the Alps, but never far from the timberline. It is linked to the temperate montane forest belt and inhabits damper biotopes. The larva feeds on *Calamagrostis* and *Festuca*; (g) *Apamea maillardi* (Geyer), specimens from Haute Savoie, Le Tour above Chamonix, 1500m, France, July 2007, illustrating the range of variation. A species associated with colder montane areas where it is found from mid altitude woodland to rocky areas well above the timberline. At these altitudes it can coexist with *A. zeta*.

(5). Photographs. (a) Male *Erebia euryale adyte* (Hübner) (Nymphalidae) feeding on the putrefying head of an Alpine Marmot *Marmota marmota* (L.) in the Julier Pass, 2300m, Graubünden, Switzerland. July 2012. (b) Two species of noctuid moths visiting flowers diurnally in the French and Swiss Alps – *Calamia tridens* (Hufnagel), Hautes-Alpes, St Crepin, 1500m, France, July 2011 and *Eriopygodes imbecilla* (F.), Graubünden, Julier Pass, 2300m, Switzerland, July 2012. Both these familiar British species commonly exhibit daytime flying and nectaring in the Alps, a behaviour only observed extremely rarely in Ireland and Wales.

PLANT, C. W. – Various European members of the macro moth family Erebidae. A representative selection of the striking moths in this family: *Aedia funesta* (Esper) Bulgaria, Kresna, 9.v.2009, leg. C. W. Plant; *Aedia leucomelas* (L.), Bulgaria, Durankulak, 14.ix.2009, leg. C. W. Plant; *Catephia alchymista* (D. & S.), Bulgaria, Kozhuh, 11.v.2002, leg. C. W. Plant; *Zethes insularis* Rambur, Bulgaria, Kozhuh, 11.v.2010, leg. C. W. Plant; *Ophiusa tirhaca* (Cramer), Greece, Thermopyle, 23.x.2008, leg. C. W. Plant; *Minucia lunaris* (D. & S.), Bulgaria, Kalimantzi, 12.v.2010, leg. C. W. Plant; *Clytie syriaca* (Bugnion), Bulgaria, Kresna, 23.v.2002, leg. C. W. Plant; *Dysgonia algira* (L.), Bulgaria, Kresna, 23.v.2002, leg. C. W. Plant; *Grammodes bifasciata* (Petagna), Bulgaria, Durankulak, 14.ix.2009, leg. C. W. Plant; *Grammodes stolidia* (F.), Bulgaria, Pobiti Komani, 12.viii.2009, leg. C. W. Plant; *Euclidia glyphica* (L.), Bulgaria, Kozhuh, 26.v.2002, leg. C. W. Plant; *Euclidia mi* (Clerck), Hungary, Csakvár, 19.v.1997, leg. C. W. Plant; *Gonospileia triquetra*

(D. & S.), Bulgaria, Zemen Mountain, Polska Skakavitsa, 23.v.2002, leg. C. W. Plant; *Drasteria callino* (Lefebvre), Bulgaria, Zemen Mountain, Polska Skakavitsa, 23.v.2002, leg. C. W. Plant; *Catocala fulminea* (Scopoli), Slovakia, Priesnik, Bransko, 15.viii.2004, leg. C. W. Plant; *Catocala nymphagoga* (Esper), Spain, Aliezo, 30.vii.1997, leg. C. W. Plant; *Catocala hymenaea* (D. & S.), Slovakia, Priesnik, Bransko, 15.viii.2004, leg. C. W. Plant; *Catocala lara* Bremer, Siberia, Amurland, 31.vii.1992, leg. Y. Berezhnoi, in coll. C. W. Plant; *Catocala fraxini* (L.) France, Meuse, Ornes, 1.ix.1991, leg. C. W. Plant; *Catocala conjuncta* (Esper), Spain, Huesca, 2.x.1988, leg. C. W. Plant; *Catocala electa* (Viewig), Spain, Cantabria, Pesaguero, 29.viii.2011, leg. Teresa Farino, in coll. C. W. Plant; *Catocala elocata* (Esper), Spain, Cantabria, Potes, 11.x.2007, leg. C. W. Plant; *Catocala nupta* (L.), Spain, Cantabria, Pesguero, 26.viii.2011, leg. Teresa Farino, in coll. C. W. Plant; *Catocala puerpera* (Giorna), Hungary, Bugac, 10.viii.2009, leg. C. W. Plant; *Catocala optata* (Godart), Portugal, Setubal, 10.x.1996, leg. C. W. Plant; *Catocala sponsa* (L.) France, Auxerre, Yonne, 28.viii.1983, leg. B. Goater, in coll. C. W. Plant; *Catocala promissa* (D. & S.), France, Tarn, Graddé, 28.vi.2005, leg. C. W. Plant; *Ascalapha odorata* (L.), Argentina, 2011, leg. G. Wenman, in coll. C. W. Plant (known in Europe as an 'accidental' species, including a single British record); *Apopestes spectrum* (Esper), France, Tarn, Graddé, 31.v.2001, leg. C. W. Plant; *Autophila dilucida* (Hübner), Spain, Huesca, 3.x.1998, leg. C. W. Plant; *Autophila cataphanes* (Hübner), Spain, Huesca, 3.x.1988, leg. C. W. Plant; *Scoliopteryx libatrix* (L.), Hungary, Bugac, 11.ix.2012, leg. C. W. Plant; *Lygephila procax* (Hübner), Bulgaria, Balchik, 14.viii.2009, leg. C. W. Plant; *Colobochyla salicalis* (D. & S.), Slovakia, Priesnik, Bransko, 28.v.2005, leg. C. W. Plant; *Zezeba falsalis* (Herrich-Schäffer), Malta, Wied Quannota, 10.iv.1994, leg. C. W. Plant.

DIPTERA

CHANDLER, P. J. – *Hermetia illucens* (L.) (Stratiomyidae) (Plate 4, Fig. 4), known as 'The Black Soldier Fly', two males collected in Sri Lanka in 1974 were exhibited to illustrate the possibility that this species may become established in the British Isles. The fly is of Neotropical origin, but extending quite far north in USA, and is a synanthropic species that is now found throughout the tropics and has become established in Southern Europe. A photograph of a larva was shown; these are brownish-coloured, typical stratiomyid larvae, elongate, dorsoventrally flattened and tapered to the front end, up to 27mm in length and 6mm in width; they develop in any decomposing organic matter and are bred commercially in the USA as pet food and to break down compost. There are indications in internet discussions that the larvae may have been imported to the British Isles, although no reliable reports of larvae or adults here have been found. The reason for this exhibit is that larvae were recently reported from a compost bin in Ireland (Tim Cahill *pers. comm.*). This has yet to be confirmed but a similar report of larvae in a compost bin at Marseilles, France (Rob Wolton *pers. comm.*) suggests that it could be reliable [also see exhibit by R. D. Hawkins of an adult collected in France in 2012].

CROSSLEY, R. – Some Yorkshire Diptera found in 2012: *Oxycera rara* (Scop.) (Stratiomyidae), 9.vii, local but found regularly in eastern Yorks; *Stratiomys singularior* (Harris) (Stratiomyidae), near Spurn, 8.viii, swept from vegetation bordering a coastal brackish dyke; *Anasimyia contracta* Claussen & Torp (Syrphidae), Sand Dale, 9.vii, at a fine calcareous-seepage site on the southern edge of the North York Moors, very local in the lowland eastern half of Yorks; *Pipiza*

austriaca Meig. (Syrphidae), 18.vi, widespread but infrequent across the eastern half of Yorks; *Triglyphus primus* Loew (Syrphidae), North Cave Wetlands YWT reserve, 6.vi, there are few Yorks records but a single female was found at the same locality in 2007; *Delina nigrita* (Fall.) (Scathophagidae), Butterfly Conservation Reserve at the Yorkshire Air Museum, Elvington near York, 21.v; *Cordilura aemula* Collin (Scathophagidae), RDB3, Askham Bog, 11.iv, new to Yorks; *C. rufimana* Meig. (Scathophagidae), Notable, Bonfield Gill, 12.vii, found originally at this site in 2009 and now recorded from three peat-bogs on the North York Moors; *Norellia spinipes* (Meig.) (Scathophagidae), Notable, 6.iv, the first report for Yorks was by Ian Andrews in spring 2012 and it has subsequently been found in several localities in south and east Yorks, in association with daffodils, both wild and cultivated, by John Coldwell and Roy Crossley.

DICKSON, R. J. – Some Diptera recorded in Hampshire in 2012: *Drapetis ephippiata* (Fall.) (Hybotidae), Wickham Common (SU5810), S Hants (VC11), 30.vi. & 11.vii; *Dolichopus arbustorum* Stannius (Dolichopodidae), RDB3, Wickham Common (SU5810), 18.vii; *D. andalusiacus* Strobl (Dolichopodidae), RDB3, Hook nr Warsash (SU4805), S Hants (VC11), 16.v, on the edge of reedbed, also known from nearby Titchfield Haven NNR; *Hercostomus blankaartensis* Pollet (Dolichopodidae), The Moors NR near Bishop's Waltham (SU5517), S Hants (VC11), 18.vi, at a wetland site with some calcareous influence and a little reed; *Chrysotus laesus* (Wied.) and *Xanthochlorus ornatus* (Hal.) (Dolichopodidae), Wickham Common (SU5810), two species recorded in some numbers this year from a site which has changed little and been studied for years; *Dorycera graminum* (F.) (Ulidiidae), RDB3, Milton Common (SU6700), S Hants (VC11), 6.vi, this the fourth Solent site recorded by the exhibitor, all sites coastal and mostly very circumscribed, this one within the city of Portsmouth.

HALSTEAD, A. J. – Some local Diptera taken in 2012: *Spiriverpa lunulata* (Zett.) (Therevidae), River Feshie shingle (NH845051), N of Feshiebridge, East Inverness, male netted, 25.vii; *Leptarthrus vitripennis* (Meig.) (Asilidae), Aston Rowant NNR (SU727962), near Lewknor, Oxon, female swept, 4.viii; *Neurigona suturalis* (Fall.) (Dolichopodidae), Norbury Park (TQ153538), near Great Bookham, Surrey, female swept, 17.vi; *Cheilosia urbana* (Meig.) (Syrphidae), Brookwood Lye (SU963574), near Woking, Surrey, male swept, 7.v; *Dorycera graminum* (F.) (Ulidiidae), Warren Farm, Nonsuch Park (TQ234230), near Ewell, Surrey, female swept, 10.vi; *Neottiophilum praeustum* (Meig.) (Piophilidae), RHS Garden (TQ061581), Wisley, Surrey, female swept from hedge, 29.iv; *Gastrolepta anthracina* (Meig.) (Tachinidae), RHS Garden (TQ062582), Wisley, Surrey, female swept, 8.vi.

HAWKINS, R. D. – Two flies taken on 7.ix.2012 at Haumont, Tarn-et-Garonne, SW France, that may well be found in Britain in the near future: (1) *Systoechus ctenopterus* (Mikan) (Bombyliidae), resembling a small clear-winged *Bombylius* species but with different wing venation; (2) *Hermetia illucens* (L.) (Stratiomyidae) (Plate 4, Fig. 3), a large soldierfly with long antennae and patterned green eyes (in life), this specimen came indoors and was buzzing around a lamp at night [see above exhibit by P. J. Chandler concerning its origins and biology; the abdominal markings of the French specimen were more restricted than in the Sri Lankan specimens]. Photographs (taken by G. Collins) were exhibited of three aspects of the specimen and showing the eye colours; this was achieved by keeping it in a tube containing chopped laurel leaves and intermittently freezing it, so that it was still 'fresh' when photographed a fortnight after capture – the eye colours were lost on drying. The exhibit also included an extract from *Guide des Mouches et des Moustiques*, a French translation of *Fliegen und Mücken* by J. & H. Haupt.

MERRIFIELD, R. K & R. M. – *Gymnosoma rotundatum* (L.) (Tachinidae) (Plate 4, Fig. 5), 15.ix.2012, Ben's Field, Southwater Country Park (TQ162259), W. Sussex; found during a British Plant Gall Society field meeting, when Rita noticed a fly on an umbel of wild carrot *Daucus carota*; this is a 85 acre former brickworks site near Horsham that includes three lakes and a variety of habitats and Ben's Field is a meadow area surrounded by hedges; the Park is owned and managed by Horsham District Council and the exhibitors thank their Countryside Services Unit for permission to run the meeting and Tom, the Warden, for assistance and advice during the event.

PERRY, I. – A selection of uncommon Diptera found during 2012; *Rhagio strigosus* (Meig.) (Rhagionidae) (Plate 4, Fig. 2), Warburg NR (SU715879), Oxfordshire, 18.viii, males on shady side of beech trunk, still present the following week with other apparently suitable trees unoccupied; *Oxycera dives* Loew (Stratiomyidae), Foss (NN781561), Perthshire, 13.vi, swept from coltsfoot *T. farfara* beside stream; *Dorycera graminum* (F.) (Ulidiidae), Lode (TL531626), Cambs, 26.vi, sitting on the exhibitor's yellow washing line; *Stemonocera cornuta* (Scop.) (Tephritidae), Lynford Water (TL826948), Norfolk, 1.viii, swept from edge of gravel pit; *Themira biloba* Andersson (Sepsidae), Lynford Water (as above); *Phyllomyza beckeri* Kramer (Milichiidae), Minsmere NR (TM478665), Suffolk, 23.vii, first found here by Jon Cole in 2003; *Phaonia zugmayeriae* (Schnabl) (Muscidae), R. Tay, Aberfeldy (NN867497), Perthshire, 10.vi, numerous on leaves of butterbur *P. hybridus*; *Angioneura acerba* (Meig.) (Calliphoridae), Lynford Water (as above) 1.viii; *A. cyrtoneurina* (Zett.) (Calliphoridae), Lynford Water (as above) 8.viii; *Erycia furibunda* (Zett.) (Tachinidae), Martin Down NNR, (SU058189), Hampshire, 8.vii, a female on parsnip *P. sativa* all previous records appear to be from damp grasslands that its usual host the Marsh Fritillary *Euphydryas aurinia* (Rott.) frequents – however, *E. aurinia* is present on Martin Down and at other downland sites in the South West and *E. furibunda* may be more widespread than previously thought; *Phebellia villica* (Zett.) (Tachinidae), Warburg NR (as above), 1.ix, a male on parsnip *P. sativa* apparently the first record since 1955; *Appendicia truncata* (Zett.) (Tachinidae), Braes of Foss (NN751557), Perthshire, 13.vi, on flowers of rowan *S. aucuparia* at edge of unimproved, upland pasture; *Eurithia intermedia* (Zett.) (Tachinidae), Weather Heath, (TL784780), Suffolk, 23.v.

WEBB, J. A. – *Microdon devius* (L.) (Syrphidae) in Oxfordshire. Specimens of this rare ant-associated hoverfly were shown from two sites in Oxon, VC 23:

(i) Aston Rowant NNR on the Chilterns, a known site where there is an old record of this species; two specimens were caught on 18.vi.2012 in the part of the site south of the M40 motorway known as Linky Down, where they were caught flying around anthills of the yellow meadow ant, *Lasius flavus* (F.) on a NNW facing slope in longish rich chalk grassland flora. At the top of the slope clay with flints dominates the soil under the anthills.

(ii) Barracks Lane Meadow, Oxford City, a small area of old damp lowland meadow retained as a Local Wildlife Site when most of the meadow had been built on in the Cowley Marsh area; here there are large yellow meadow anthills on a rather heavy clay soil with damp meadow species such as tufted hair grass, devil's bit scabious, dropwort and spiny restharrow; one specimen was caught flying around an anthill adjacent to scrub on 20.vi.2012; the site has had no grazing or cutting management for many years and the anthills had become very large.

COLEOPTERA

ALEXANDER, K. N. A. – Beetles from sites across England and Scotland during 2012. *Claviger testaceus* Preyssler (Staphylinidae) N, Kildown Point, W. Cornwall

(VC1), SW7214, suction sampling, 2.v.2012 – first record since Victoria County History (1906); *Aphanisticus pusillus* (Olivier) (Buprestidae) Nb, Enys Head, W. Cornwall (VC1), SW7215, suction sampling, 2.v.2012; *Ptinus subpilosus* Sturm (Anobiidae) Nb, Calke Park, Derbyshire (VC57), SK3622, in flight trap inside hollow lime tree, emptied 12.vii.2012, new to site list; *Lymexylon navale* (L.) (Lymexylidae) RDB2, Calke Park, Derbyshire, in flight trap inside hollow horse chestnut, emptied 18.x.2012; *Epuraea terminalis* (Mannerheim) (Nitidulidae) RDBI, Cleghorn Glen, Lanarkshire (VC77), NS8845, in flight trap amongst fallen oak branches, emptied 25.ix.2012; *Epuraea variegata* (Herbst) RDBK, Glen Feshie (VC96), NN8494, knocked from *Fomes* brackets, 22.vii.2012, & Coille na Craige Duibhe, Inverness-shire (NN6998, VC96), *Fomes*, 24.vii.2012; *Dendrophagus crenatus* (Paykull) (Silvanidae) Nb, Lagganlia, Feshiebridge (VC96), NH8504, collapsed pine, 27.vii.2012; *Notolaemus unifasciatus* (Latreille) (Laemophloeidae) Na, Calke Park, Derbyshire, one dead beneath loose bark on stack of felled sycamore trunks, 18.x.2012; *Abdera quadrifasciata* (Curtis) (Melandryidae) Na, Calke Park, aerial dead branches on oak, 11.vii.2012, new to site list; *Phloiotrya vaudoueri* Mulsant Nb, Calke Park, under dead trunk bark on oak, 12.vii.2012, new to site list; *Cryptocephalus bilineatus* (L.) (Chrysomelidae) Nb, Kynance Cliff, W. Cornwall (VC1), SW6713, suction sampling, 1.v.2012, first modern record for county; *Longitarsus oblitteratoides* Gruev, Kildown Point, W. Cornwall (VC1), SW7214, suction sampling, 2.v.2012; *Cassida prasina* Illiger Nb, Porthleven Cliffs, W. Cornwall (VC1), SW6424, suction sampling, 3.v.2012; *Enedreytes sepicola* (F.) (Anthribidae) RDB2, Briddlesford Park, Isle of Wight (VC10), SZ5490, one from aerial dead branches on a former hedgerow oak, 20.vi. & another, 21.viii.2012, new to Island; *Orthochaetes insignis* (Aubé) (Curculionidae) Nb, Kildown Point, suction sampling, 2.v.2012.

ALLEN, A. J. – *Graphoderus cinereus* (L.) (Dytiscidae), Canvey Island South Essex, TR793841, 23.x.2011, one in Canvey Lake; *Bembidion geniculatum* Heer (Carabidae), Sewerby, South-east Yorkshire, TA200686, 13.v.2012, several dozen seen running on a large pile of mud at the base of the cliffs formed by water dripping down; *Bembidion stomoides* Dejean (Carabidae), Talgarth, Brecon, SO1632, 31.v.2012, one found on shingle beside a woodland stream; *Margarinotus obscurus* (Kugelann) (Histeridae), Gribbin Head, East Cornwall, SX0949, 18.vi.2011, one in cow dung; *Leiodes triepkii* (W. Schmidt) (Leiodidae), West Harling Heath, West Norfolk, TL9683, 3.viii.2011, several at a light trap; *Philonthus confinis* A. Strand (Staphylinidae), Bearsted, East Kent, TQ805553, 27.vi.2012, several in horse dung; *Odonteus armiger* (Scopoli) (Geotrupidae), West Harling Heath, West Norfolk, TL9683, 3.viii.2011, several at a light trap; *Euheptaulacus sus* (Herbst) (Scarabaeidae), Sandwich Bay, East Kent, TR3658, 2.ix.2012, one swept; *Calambus bipustulatus* (L.) (Elateridae), Draycote Meadows, Warwickshire, SP4470, 1.vi.2012, one swept, the first county record since the 19th century; *Silvanoprus fagi* (Guérin-Méneville) (Silvanidae), near Staplecross, East Sussex, TQ7722, 4.vi.2012, several from a felled spruce; *Sitaris muralis* (Forster) (Meloidae), Brockenhurst, South Hampshire, 23.viii.2010; *Hylotrupes bajulus* (L.) (Cerambycidae), Ockham Common, Surrey, TQ0858, 9.viii.2012, several seen on dead pine stumps; *Mesosa nebulosa* (F.) (Cerambycidae), Langley Wood, South Wiltshire, SU2320, 25.v.2010; *Cryptocephalus sexpunctatus* (L.) (Chrysomelidae), Stockbridge Down, North Hampshire, SU3834, 14.vi.2012, beaten from hazel; *Pseudeuparius sepicola* (F.) (Anthribidae), Ebenoe Common, West Sussex, SU977270, 29.vi.2011, one beaten from oak; *Choragus sheppardi* Kirby (Anthribidae), near Knowle Park, Sevenoaks, West Kent, TQ5355, 3.vii.2011; *Rhopalomesites tardyi* (Curtis) (Curculionidae), Bossington, South Somerset,

SS8948, 22.x.2011, one from flood litter; *Allopentarthrum elumbe* (Boheman) (Curculionidae), Bodelva, East Cornwall, SX0454, 19.ii.2011, in plant litter in the Tropical Dome at the Eden Project; *Charagmus gressorius* (F.) (Curculionidae), Dawlish Warren, South Devon, SX9879, 16.vi.2012, two on tree lupin; *Magdalis rufa* Germar (Curculionidae), Brooklands, Surrey, TQ0762, 9.viii.2012, one on pine, new to Britain.

BOOTH, R. G. – A few recent captures. *Rhopalocerina clavigera* (Scriba) (Staphylinidae), Laleham, Middlesex, TQ0669, a single male in a flight interception trap at edge of a small wood, 19-26.v.2012, a rarely-reported species; *Aleochara binotata* Kraatz (Staphylinidae), Burnham Overy Staithe, West Norfolk, TF8545, several under dead seal pup on the beach at Gun Hill, 8.vii.2011, another record from the north Norfolk coast for this rarely-recorded species, and Wangford, West Suffolk, TL7583, one female on dead rabbit, 10.vii.2011, an unusual inland record; *Microrhagus pygmaeus* (F.) (Eucnemidae), Silwood Park, Berkshire, SU9468, one female by sweeping under trees, 1.vii.2012, recorded during their bioblitz day; *Teredus cylindricus* (Olivier) (Bothrideridae), Bookham Common, Surrey, TQ1255, among fungi on old fallen tree trunk on Central Plain area, 18.vii.2012, the second Bookham record, previously recorded there by Donald Prance; *Grammoptera ustulata* (Schaller) (Cerambycidae), Bookham Common, Surrey, TQ1255, a single specimen beating old hawthorn on Central Plain area, 30.v.2012, the first Bookham record; *Pseudostyphlus pillumus* (Gyllenhal) (Curculionidae), Silwood Park, Berkshire, SU9468, several swept from *Matricaria* etc. in old field system, 1.vii.2012, recorded during their bioblitz day, most records for this species are coastal; *Microplontus triangulum* (Boheman) (Curculionidae), Foxhole Heath, West Suffolk, TL738773, one swept from field margin by roadside, 10.vii.2011; *Melanobaris laticollis* (Marsham) (Curculionidae), Laleham, Middlesex, TQ0669, a single specimen in a flight interception trap at edge of a small wood, 19-26.v.2012.

DICKSON, R. J. – *Agrilus viridis* (L.) (Buprestidae), Orchard Copse, South Hampshire (VC11), SU5810, found on skullcap *Scutellaria galericulata*, leg. K.J.Coker, 13.vi.2012; *Megapenthes lugens* (Redtenbacher) (Elateridae), the Queen's Executioner, Denny Wood, New Forest, South Hampshire (VC11), SU3306, leg. Paul Brock, det. Howard Mendel, 23.v.2012, RDB1 dead-wood species; *Procraterus tibialis* (Boisduval & Lacordaire) (Elateridae), Denny Wood, New Forest, South Hampshire (VC11), SU3306, 23.vi.2012, RDB3 species; *Rhagonycha translucida* (Krynicky) (Cantharidae), Hen Wood, South Hampshire (VC11), SU6522, MV trap, 29.vi.2012; *Sphinginus lobatus* (Olivier) (Malachiidae), The Moors nature reserve, Bishop's Waltham, South Hampshire (VC11), SU5517, det. Martin Harvey via I-Spot, 18.vi.2012, RDBK species; *Diaperis boleti* (L.) (Tenebrionidae), Denny Wood, New Forest, South Hampshire (VC11), SU3306, 23.v.2012, this normally scarce species has been common here this year, hardly a *Piptoporus* bracket to be found that did not hold one, and as many as six per bracket; *Phymatodes testaceus* (L.) The Tanbark Borer, (Cerambycidae), Wickham Common, SU5810, South Hampshire (VC11), MV trap, leg. K.J.Coker, 27.vi.2012; *Poecilium alni* (L.) (Cerambycidae), Rewell Wood, West Sussex (VC13), SU9807, on logpile, leg. K.J.Coker, 18.vi.2012; *Leiopus nebulosus* (L.) (Cerambycidae), Fareham, South Hampshire (VC11), SU577070, MV trap, 14.viii.2012, leg. K.J. Wheeler, and Bulford Field, South Wiltshire (VC8), SU1845, 9.vii.2012; an unknown longhorn near *Stromatium* (Cerambycidae), Kites Croft, South Hampshire (VC11), SU5206, on warehouse wall, leg. Dan Houghton, 27.vi.2012, these sometimes emerge from pallets imported from tropical Africa and Asia.

DUFF, A. G. – The beaver beetle *Platypsymus castoris* Ritsema (Leiodidae), found on a young wild-born female Eurasian beaver *Castor fiber* that was trapped on the

west shore of Loch Buic, Kintyre (VC101), NR787888, by Roisin Campbell-Palmer (Royal Zoological Society of Scotland) and Robert Needham (Scottish Wildlife Trust) for a routine health check, 10.x.2012, the first record for Great Britain.

FINCH, G. L. & M. A. – *Scaphidium quadrimaculatum* Olivier (Staphylinidae), Cloud Wood, Leicestershire, SK417210, 10.iv.2011, possibly the third record from VC55 (Leicestershire & Rutland); *Corticeus unicolor* Piller & Mitterpacher (Tenebrionidae), Cloud Wood, Leicestershire, SK41632149, 23.iii.2012, the first record for VC55 for this RDB3 species; *Isochnus sequensi* (Stierlin) (Curculionidae), Hemsby, East Norfolk, TG500176, 6.x.2012.

GEORGE, A. M. – *Prionus coriarius* (L.) (Cerambycidae), Beaconsfield, Buckinghamshire, 3.viii.2012, larvae and adults found by Mr John Pendered whilst digging out a birch *Betula* stump he had felled six to ten years ago.

HALSTEAD, A. – (1) Some local Coleoptera taken in 2012. *Trichius fasciatus* (L.) (Scarabaeidae), River Feshie, south of Feshie Bridge, East Inverness, NH851024, on melancholy thistle flower, 27.vii.2012; *Coccinella quinquepunctata* L. (Coccinellidae), River Feshie, north of Feshie Bridge, East Inverness, NH845051, swept off river shingle, 25.vii.2012; *Pseudocistela ceramboides* (L.) (Tenebrionidae), Norbury Park, Great Bookham, Surrey, TQ153538, 17.vi.2012, on hogweed *Heracleum sphondylium* flower; *Tetropium gabrieli* Weise (Cerambycidae), Norbury Park, Great Bookham, Surrey, TQ153538, on felled conifer trunk, 17.vi.2012; *Pogonocherus fasciculatus* (De Geer) (Cerambycidae), Wisley Common, Surrey, TQ068589, swept, 23.iii.2012.

(2) *Axinotarsus marginalis* (Laporte de Castelnau) (Malachiidae), Clarence House garden, London SW1, TQ293799, swept by HRH The Prince of Wales, 22.vi.2012.

HAWKINS, R. D. – A series of six *Lycoperdina bovistae* (F.) (Endomychidae) that emerged from the remains of a puff-ball fungus, *Calvatia excipuliformis* (Pers.) (det. R. Tantram), taken from restored chalk downland at Park Downs, Banstead, Surrey, TQ266584, on 23.ii.2012. The last Surrey record was over 50 years ago and, although the beetle is known to develop in puff-balls, this species may be a new host.

HENDERSON, M. – Some beetles collected over many years. *Hypnoidus riparius* (F.) and *Aplotarsus incanus* (Gyllenhal) [exhibited as *Sericus brunneus* (L.)] (Elateridae), summit of Cribin Beacon, Brecon Beacons, Brecon, SO0221, 25.v.1983; *Hedobia imperialis* (L.) (Ptinidae), near Pysgodlyn, west of Abergavenny, SO265155, 6.vii.1985; *Ptinus fur* (L.) (Ptinidae), Landseer Close, Merton Abbey, Surrey, TQ265695, 21.vi.1999; *Alphitobius diaperinus* (Panzer) (Tenebrionidae), nr. Hunston, Church Lane, Chichester, West Sussex, SU8601, 6.ix.2012; *Phylan gibbus* (F.) (Tenebrionidae), Braunton Burrows, North Devon, 4.vi.1988; *Hydrothassa marginella* (L.) (Chrysomelidae), Hartland Meadow, North Devon, 3.vi.1992.

HODGE, P. J. – Coleoptera recorded from south-east England during 2012, including two species new to the British Isles. *Malthodes guttifer* (Kiesenwetter) (Cantharidae), Box Hill, Surrey, TQ176517, 18.vii.2012, swept; *Laricobius erichsoni* (Reitter) (Derodontidae), Hazeley Heath, North Hampshire, SU74975843, 11.v.2012, beaten off foliage of Scot's pine; *Meligethes matronalis* (Audisio & Spornraft) (Nitidulidae), Hammer Wood, Chithurst, West Sussex, SU84232420, 28.vi.2012 and 5.vii.2012, numerous on flowers of dame's violet *Hesperis matronalis*, the second British record and the first from Sussex; *Eulagius filicornis* (Reitter) (Mycetophagidae), Hazeley Heath, North Hampshire, SU747587 and SU749589, 23.viii.2012, beaten off dead oak branches, the first record from Hampshire; *Bruchidius imbricornis* (Panzer), South Essex, St Clere's Golf Course, Stanford-le-Hope, TQ671811, 13.v.2012, five males and one female beaten off hawthorn *Crataegus* blossom and Buckingham Hill Road, Stanford-le-Hope, TQ670810, 22.vii.2012, several swept off goat's-rue *Galega officinalis*, new to the British Isles

[*Bruchidius varius* (Olivier) exhibited for comparison]; *Ceutorhynchus inaeffectatus* Gyllenhal (Curculionidae), Hammer Wood, Chithurst, West Sussex, 28.vi.2012, one male, 5.vii.2012, one male, both on dame's violet *Hesperis matronalis*, new to the British Isles [*Ceutorhynchus rapae* Gyllenhal exhibited for comparison].

LEVEY, B. – Some notable Coleoptera collected in Norfolk and Suffolk in 2012. *Harpalus servus* (Duftschmid) (Carabidae), Minsmere Cliffs, Dunwich, East Suffolk, TM477678, 28.vi.2012, one under plant debris on vegetated sand dunes; *Masoreus wetterhalli* (Gyllenhal) (Carabidae), Maidcross Hill, West Suffolk, TL7282, 26.vi.2012, one by suction sampling; *Lycoperdina succincta* (L.) (Endomychidae), Maidcross Hill, West Suffolk, TL7282, 26.vi.2012, one in small puffball fungus; *Agrilus cyanescens* Ratzeburg (Buprestidae), Cavenham Heath N.N.R., West Suffolk, TL752724, 27.vi.2012, one captured on honeysuckle leaves growing amongst bramble in shade beneath birch trees, this appears to be the first record from Suffolk of this recently arrived species; *Agrilus angustulus* (Illiger) (Buprestidae), Cavenham Heath N.N.R., West Suffolk, TL7472/7572, 27.vi.2012, one captured on bramble leaves beneath mature oak trees; *Clanoptilus marginellus* (Olivier) (Malachiidae), The Haven, Aldeburgh, East Suffolk, TM468583, 28.vi.2012, one by sweeping on coastal shingle; *Platynaspis luteorubra* (Goeze) (Coccinellidae), Cranwich Camp, West Norfolk, TL7794, 27.vi.2012, one by suction sampling; *Corticeus linearis* (F.) (Tenebrionidae), Chalk Lane, The Kings Forest, West Suffolk, TL8374, 26.vi.2012, one by beating small dying pine; *Diaperis boleti* (L.) (Tenebrionidae), Chalk Lane, The Kings Forest, West Suffolk, TL8374, 26.vi.2012, numerous adults on decaying *Piptoporus betulinus* fungus on dead birch; *Magdalis memnonia* (Gyllenhal in Faldermann) (Curculionidae), Chalk Lane, The Kings Forest, West Suffolk, TL8374, 26.vi.2012, numerous adults on small dying pine; *Trachyphloeus spinimanus* Germar (Curculionidae), Barnham Cross Common, West Suffolk, TL866810, 28.vi.2012, one by suction sampling.

HYMENOPTERA

BALDOCK, D. W. – Two rarely found small sphecids wasps, restricted to south-east England. *Crossocerus exiguus* (Vander Linden) female, 11.vii.2012, picked off wet thistle, Oxshott Heath, Surrey. *Passaloecus turionum* Dahlbom female, collected in Malaise trap 23.vii–11.ix.2012, Chobham Common, Surrey.

DICKSON, R. J. – *Tenthredo schaefferi* Klug (Tenthredinidae), a sawfly, Horse Down SU0427 South Wiltshire (VC 8) 20.viii.2012, this formerly scarce species seems to be enjoying good times and was recorded twice at this site this year.

DOBSON, A. H. – *Bombus hypnorum* (L.) which visited a MV light trap between 2300 and 2350 hours on 22.vi.2010 at the exhibitor's garden at Brighton Hill, Basingstoke, North Hants.

HALSTEAD, A. J. – (1) Some pamphiliid and diprionid sawflies taken in 2012. All specimens exhibited were females with larvae that feed on *Pinus* spp, except *Pamphilius varius*, which has larvae that feed on *Betula* spp. Pamphiliidae: *Acantholyda erythrocephala* (L.), 6.iv.2012, on Scots pine, Horsell Common, nr Woking, Surrey, TQ009611; *Acantholyda posticalis* Matsumura, 22.vii.2012, swept from Scots pine, Lagganlia Centre, nr Kingussie, East Inverness, NH853041; *Pamphilius varius* (Serville), K. Alexander col., 24.vi.2012, Balavil Lynchat, East Inverness, NH 78 02. Diprionidae: *Diprion similis* (Hartig), 2.vii.2012, on Scots pine, RHS Garden, Wisley, Surrey, TQ062581; *Gilpinia frutetorum* (F.), 14.viii.2012, on Scots pine, RHS Garden, Wisley, Surrey, TQ062581.

(2) A display of adult sawflies that have alder-feeding larvae, with photographs of some of these larvae and a herbarium sheet with mines of the two leaf-mining species.

Twenty-two species of sawflies in Britain are associated with *Alnus* spp; twelve of these feed on alder only, the others can also feed on some other plants. The alder-specific species shown: *Cimbex connatus* (Schrank), *Heterarthrus vagans* (Fallén), *Fenusa dohrnii* (Tischbein), *Monsoma pulveratum* (Retzius), *Eriocampa ovata* (L.), *Platycampus luridiventris* (Fallen), *Nematinus fuscipennis* (Serville), *Nematinus luteus* (Panzer), *Nematinus steini* (Blank), *Craesus alniastri* (Scharfenberg), *Nematus viridissimus* (Moller); an alder-specific sawfly not in the display was *Pamphilius vafer* (L.). Sawflies on alder and various other plants were *Xiphydria camelus* (L.), *Hemichroa australis* (Serville), *Hemichroa crocea* (Geoffroy), *Pachyprotasis antennata* (Klug), *Rhogogaster chlorosoma* (Benson), *Rhogogaster punctulata* (Klug), *Rhogogaster viridis* (L.), *Tenthredo ferruginea* Schrank, *Craesus septentrionalis* (L.), *Nematus pavidus* Serville.

KAUNANG, J. F. & COLLINS, G. A. – *Colletes cunicularius* (L.) new to Surrey. This solitary bee was captured in a sandpit near Oxted, Surrey by JFK on 30.iv.2012 (Collins & Kaunang, 2012). Until recently this species was confined in Britain to the coast of Wales and north-west England where it forages from willow species, especially creeping willow *Salix repens*. Several examples were found inland in central England in 2011, but this example from Surrey, together with a pair found in South Hants earlier in the month (Else, 2012), may represent expansion from the continent. [Collins, G. A. & Kaunang, J. F., 2012. *Colletes cunicularius* (Linnaeus) in Surrey. *BWARS Newsletter*, Spring 2012. 12–13. Else, G. R., 2012. *Colletes cunicularius* (Linnaeus, 1761) in Hampshire. *BWARS Newsletter*, Spring 2012. 11–12.]

WHEELER, K. J. – (1) Aculeate Hymenoptera. Wickham Common. SU5810. VC11. South Hants. Solitary wasp species comprising Chrysididae, Pompilidae and Crabonidae collected using pan-traps from 30.vi.2012–13.viii.2012. *Chrysis ignita* complex (L.) two examples, 4.viii & 12.viii.2012; *Chrysis illigeri* (Wesmael) two examples, 25.vii & 2.viii.2012; *Priocnemis fennica* (Haupt) two examples, 13.vii & 22.vii.2012, both sexes;

Priocnemis hyalinata (F.) two examples, 20.vii.2012, both sexes; *Priocnemis parvula* (Dahlbom) a male 23.vii.2012; *Nysson trimaculatus* (Rossi) both sexes, 29.vii.2012; *Nysson dimidiatus* (Jurine) a male, 23.vii.2012; *Pemphredon morio* (Vander Linden) two female examples, 6.vii & 23.vii.2012.

(2) Hymenoptera parasitica. Ichneumonidae. Botley Wood, SU5309, South Hants. *Stauropoctonus bombycivorus* (Gravenhorst). This fine ichneumonid (Plate 4, Fig. 1) was captured at mercury vapour light on the 14.viii.2012. The largest of our Ophionines, it is an uncommon species and, like others of this group of mainly nocturnal insects, is a parasite of Lepidoptera and is a visitor to illuminated moth traps. In Hampshire it is known to occur in broadleaved woodland and is believed to be associated solely with the Lobster moth *Stauropus fagi* (L.), targeting the larvae.

HEMIPTERA

BANTOCK, T. – *Tropidosteptes pacificus* (Van Duzee) (Miridae) (Plate 4, Fig. 6), Alexandra Park, north London (VC21), 11.vi.2012, two adults swept from mature ash *Fraxinus excelsior*; and a much larger second generation on 20.ix.12 when many adults collected from several large ash trees; a nearctic species recorded in Holland in 2007/08; first records for Britain.

DICKSON, R. J. – *Eurhadina pulchella* (Fallén) (Cicadellidae), Wickham Common, SU5810, South Hampshire (VC11) 24.vii.2012, leg. K. J. Wheeler. *Dikraneura variata* Hardy (Cicadellidae), Wickham Common, SU5810, South Hampshire (VC11) 24.vii. & 4.viii.2012, leg. K. J. Wheeler. *Arenocoris waltli* (Herrich-Schäffer) (Coreidae,

RDB2), Ramparts Field, TL787715, West Suffolk (VC26) 9.vi.2012, leg. Paul Brock, with *A. falleni* (Schilling) found at the same site on the same day. *Gastrodes abietum* Bergroth (Lygaeidae), Lee Ground Coppice, SU5309, South Hampshire (VC11), 10.x.2012, very sensitive to changes in humidity preferring enclosed spaces such as spruce cones, this one was apparently sunning on a willow leaf.

FLANAGAN, J. – *Closterotomus trivialis* (Costa) (Miridae) (Plate 4, Fig. 7), Owlthorpe Meadow, south-east Sheffield, SK4182, South Yorkshire (VC57), 1.vi.2011, leg. D. Whiteley, single male swept from flower-rich grassland, first Yorkshire record; Lake Windermere, SD399993, Cumbria (VC69), 12.vi.2012, leg. J. Flanagan, male swept from meadowsweet-rich vegetation on east shore of lake, first Cumbria record.

HODGE, P. J. – *Orthops basalis* (Costa) (Miridae), The Liz Williams Butterfly Haven Nature Reserve, Brighton, East Sussex (VC14), TQ309072, 8.ix.2012, swept off wild carrot *Daucus carota*. *Orthops kalmi* (L.) exhibited for comparison.

RAPHIDIOPTERA

DICKSON, R. J. – *Phaeostigma notata* (F.) (Raphidiidae), a snake-fly, Wickham Common SU5810, South Hampshire (VC11) 18.vi.2012, Malaise trap, leg. K. J. Wheeler.

NEUROPTERA

DICKSON, R. J. – *Osmylus fulvicephalus* (Scopoli) (Osmylidae), the giant lacewing, Bonham's Farm, Crockerhill, South Hampshire, SU5810, 17.vi.2012, leg. K. J. Coker. More usually found on the underside of small bridges, this one was netted flying in sunshine.

PLANT, C. W. – *Nineta impunctata* (Reuter). This single female green lacewing was recently found in the sample for 23 September 2012 from a 12.2 metre (40-foot) Rothamsted Suction Trap at Brooms Barn, near Bury St Edmunds in West Suffolk (VC 26). This is only the second occurrence of this lacewing in the British Isles; the first example was also a female. The ecology is unknown and the species is rare throughout mainland Europe [see Plant, C. W. & Shortall, C. R., 2012. *Nineta impunctata* (Reuter, 1894) (Neu.: Chrysopidae): A second British Isles record. *Entomologist's Record and Journal of Variation* **124**: 234–236].

GENERAL

GIUSTINI, A. – A series of insect specimens collected during official fieldwork and holidays. The specimens from Arizona were collected in August 2012 in and around the South Western Research Station of the American Museum of Natural History near Portal, South East Arizona. Most specimens were collected at light during a 10-day Lepidoptera Training Course attended by the exhibitor.

The Lepidoptera from Italy were collected during various recent holidays to Italy, mainly by day. The tineid from Brazil was collected indoors in a flat in Guarujá, a seaside resort near Sao Paulo.

HARMER, A. S. – Like Father – Like Son: The 'Lost' Entomological Watercolours of John Harris (1767–1832). For over two centuries the existence and historical significance of nine eighteenth-century watercolours had lain undetected until a chance remark in conversation about the exhibitor's interest in butterflies led to an invitation for him to view the paintings. He recognised their entomological importance and subsequently was able to establish that the artist was the son of Moses Harris.

Scanned copies of the paintings were exhibited. The originals, executed on vellum in 1796, are almost exact mirror (or reverse) copies of nine of the first eleven plates that appear in the original *The Aurelian*, first published in 1766.

Records show that John Harris did exhibit paintings of entomological subjects at the Royal Academy's summer exhibitions between 1797 and 1814; however the exhibitor has been unable to locate any other examples of this subject matter by him.

Much of what is known about John Harris is contained in a memoir written by his son (also named John) in which he mentions his father's skill in the painting of various natural history subjects. He is better known to the wider world for the designs he produced for the illustrating of books and for his ornamentation of books to an extremely high standard, examples of which are in the British Museum and the library of Harvard University.

The exhibitor's research has drawn together the lives of three generations of this remarkable family, including some little known and possibly new information about Moses Harris. This research together with a full account of this remarkable find including colour plates is due to be published in the Royal Entomological Society's journal *Antenna*.

KAUNANG, J. F. & COLLINS, G. A. – A display showing the Small Blue butterfly *Cupido minimus* (Fuessly) at Warren Farm, Cheam, Surrey. Photographs illustrating the site, the butterfly, the foodplant, and other species present were shown, along with articles mentioning the site. The threat from the invasive alien plant Canadian goldenrod *Solidago canadensis* was discussed and practical conservation measures suggested. These include removal of goldenrod by hand pulling and encouragement of kidney vetch, the larval foodplant, by creation of bare ground and re-seeding from plants on the site.

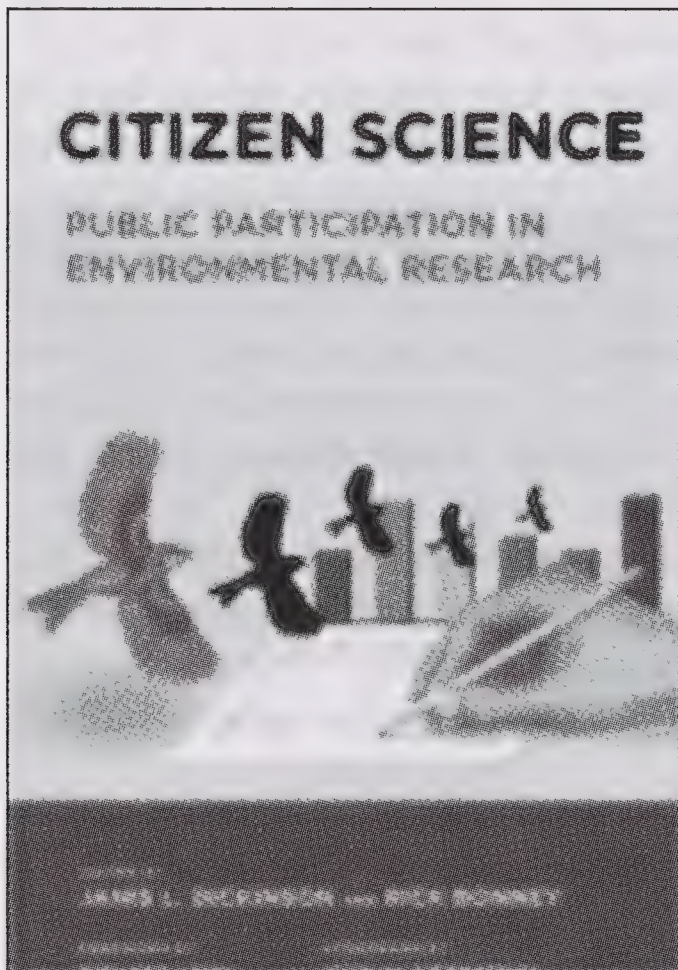
REVELS, R. – A mixed display of British wildlife pictures from the Photo Library of Richard Revels. Among the subjects shown were a range of beetles, moths, butterflies, dragonflies, damselflies, wasps and assorted other insects.

STUBBS, A. E. – A list of invertebrate species associated with common ash *Fraxinus excelsior* L. in the UK and likely to be significantly affected by the recently introduced ascomycete fungus *Chalara fraxinea* (Kowaski), the causative agent of ash die-back disease.

WARING, P. – During the appalling recording season of 2012 there was a need to inject much-needed mirth, especially when it came to the Health & Safety part of the Lepidoptera workshops organised by the exhibitor, when eyes often start to glaze over and attention wanders! Accordingly, the exhibitor put together a comprehensive illustrated review of the subject, greatly assisted by his accomplice Mo Elliston, with guest appearances of well-known pin-up girls Bernie Dexter and Stephanie Jay. The review deals with everything from the general hazards of working in 'moth' habitats to the specifics of working around mercury-vapour lights, avoiding tripping over cables, lifting, starting and maintaining generators, moths entering ears, and much more. The presentation has been well-received in workshops and appears to be effective. Sample photographs and captions were shown. The full version has been submitted for publication in *Atropos*.

YOUNG, D. – Photographs of various good entomological sites in Britain and France, memories of many happy hours 'in the field'. Site photographs can be interesting to see how sites change in character over the years. Woodland clearings disappear as tree growth closes in above: scrub invades open downland and land continues to disappear under the plough, tarmac or concrete. In 2012 alone, two sites of local interest in Saxmundham, a small market town in Suffolk, have been destroyed in this manner.

BOOK REVIEW



Citizen Science: Public Participation in Environmental Research edited by Janis L. Dickinson and Rick Bonney. (Comstock Publishing Associates, Cornell University, 2012) Hardback. 279pp. US\$ 49.95. ISBN 978-0-8014-4911-6.

The authors, of this hot off the press book, state that citizen science is a term that, as far as they know, has yet to appear in any official dictionary, but an Internet search for the phrase yields thousands of projects from breeding bird atlases to aquatic insect counts, from frog-watching projects to reef fish surveys. The book's aim is to provide examples and insights that illustrate the relationship between goals, programme designs, and outcomes, including new ideas for programme developers, researchers and educators who wish to work with large-scale citizen science.

The subject is timely, exemplified by the article by Roger Morris in the previous issue (p. 143–152). Certainly there is much of use to learn from others who have initiated large scale national projects, lots of good tips on the types of ecological surveys to undertake and ways to analyse the masses of emerging data.

Of course, participating in ecological surveys is in itself a form of collective human behaviour and so it is not surprising that social biologists have turned their attention to studying how we behave. For example, the development of computer recording and mapping programs such as Recorder© and Mapmate© have significantly affected the way many field biologists think and operate, the primary aim today being to place dots on maps, often to the detriment of more ecologically based studies. More effort should be devoted to studying how these dots 'live'.

The usefulness of the book to UK entomologists is somewhat limited by the fact that only one of the 45 contributors has experience from outside the US, namely Professor Jeremy Greenwood, former director of the British Trust for Ornithology, and more tellingly, at least 20 of the contributors are linked to Ornithology Departments. The only chapter devoted to insects is Karen Oberhauser's on 'Monitoring Monarchs: Citizen Science and a charismatic insect'. This all goes to underline one of the major stumbling blocks to invertebrate surveys, of species small size and the difficulty of identification – binoculars and a camera won't do. Despite all this, the book does underline what can be achieved by involving the public in monitoring local biodiversity – we just have to think of new and better ways to do this. It is amazing to note how many US academic departments are involved and indeed encouraged to undertake citizen science when British higher education seems to be moving in the opposite direction, largely driven by point scoring in publication league tables. It would be nice to believe that, with the government's stated interest in 'the big society' we might see a move in the right direction. My current impression is that the thrust is for all to 'enjoy nature' – the land beyond the last row of houses; but if it disappears, so be it.

JOHN BADMIN

SHORT COMMUNICATION

Cord-grass planthopper *Prokelisia marginata* (van Duzee) (Hem: Delphacidae) in Devon. – The rapid spread of this North American planthopper in south-eastern England since its first appearance along the Hampshire coast in 2008 has been documented by Wilson and Mühlerthaler (2008), Badmin and Witts (2009), Denton (2010) and Badmin (2010).

It is therefore not so surprising to report that *P. marginata* managed to reach south Devon during the same time period and to colonise some of the saltings there. To date, the planthopper has only been recorded from common cord-grass *Spartina anglica* in the UK. Distribution maps for cord-grass show that both *S. anglica* and the hybrid *Spartina* × *townsendii* occur in south Devon (Ivimey-Cook, 1984; Preston *et al.*, 2002). Although *Spartina* is shown to occur fairly widely along the southern Devon coastline from Newton Ferrers in the west to the river Dart in the east, it does not occur in any appreciable quantity except along the estuary of the river Avon at Aveton Gifford. The planthopper was first recorded here (SX683468) on 20.ix.2009 and again on 21.ix.2011, on both occasions in great quantity. Most of the *Spartina* plants were noticeably taller, with larger ligules than the *Spartina* plants encountered in Kent and presumed to be the hybrid.

One might suspect the Salcombe estuary with its many inlets of supporting suitable saltmarsh habitat, but *Spartina* is exceedingly localised and the planthopper was found only at Batson village on the edge of Salcombe (TX738397) on 26.ix.2009. Small patches of *Spartina* at nearby Snapes Manor (TX741397) and Snapes Point proved negative. No saltmarsh was found at Lincombe (TX742405) despite it looking potentially interesting on the map. Other areas of the estuary were searched by boat without success. Thus the planthopper had managed to locate and establish itself on a patch of *Spartina*, at most 4 × 10m, in an estuary covering an area of approximately 30 square kilometres.

A quick survey was made of the estuary of the River Dart. Small patches of *Spartina* (2 × 5m) were located on the eastern bank of the river south of Totnes (TX816589) but not on the southern bank opposite which is designated as ‘saltmarsh’ habitat on the OS map, as this is now enclosed and losing its maritime character. A 2 × 3m patch of *Spartina* was found at Dittisham (SX866552) lower down the estuary but no planthoppers were present.

It appears that *P. marginata* has managed to disperse rapidly along the southern coast soon after its arrival in the UK and should be sought further west in bays around Plymouth and the few localities in Cornwall where *Spartina* is known to occur. In North America this species has been found far out to sea (D. Strong, pers. comm.) and so there is every chance that it may have already reached as far as Ireland. Certainly it should be looked for along the south-eastern coastline between Wexford and Cork where *Spartina* grows abundantly.

It is amazing that we still do not have a fully effective way of tracking the dispersal of small flying insects at the species level. *Prokelisia marginata* has dispersed over 400km in the space of probably < 5 years without any individuals being detected in transit. The horse-chestnut leafminer *Cameraria ohridella* Deschka & Dimic has shown an equally dramatic spread and there have been no reports of its occurrence in traps: its spread has been mapped simply by plotting the distribution of infested trees. However there is some evidence that the moth might disperse through a combination of active flight over short distances, assisted by local winds, and be transported over longer distances by human activity (Gilbert *et al.*, 2004, Augustin *et al.*, 2009). This implies the moth should spread more slowly in rural areas.

Prokelisia species in temperate areas of North America have been recorded as migrating during the daytime (Denno & Roderick, 1990), a behaviour which can be more difficult to track. In the UK, a network of insect suction traps is operated by Rothamsted primarily for tracking aerial pest insects such as aphids, but many other insect groups have been collected in samples (Harrington & Woiwod, 2007; Shortall *et al.*, 2009). Voucher specimens of *P. marginata* have been sent to Rothamsted so that any planthopper specimens found in trap samples can be compared with these for ease of identification. So far, no aerial samples containing *P. marginata* have been discovered. The continuing operation of these traps is extremely important as they represent the only sampling technique currently available for quantitatively measuring changes in abundance of aerial flying insects across the UK apart from the Rothamsted light-trap network for monitoring macromoths. The latter network has been crucial in providing strong quantitative evidence for the steady decline in abundance of many species of macromoth and recent studies with suction trap samples suggest that there may be similar declines in other taxa such as Diptera, though the patterns of change vary considerably between trap sites (Shortall *et al.*, 2009).

Prokelisia marginata has also been caught at night in a light-trap in the Gulf of Mexico, confirming that it can disperse over long distances, possibly at night as well as daytime, presumably depending on prevailing wind currents (Sparks *et al.*, 1986). This suggests the planthopper should be looked for in light-traps operated by lepidopterists. This should be possible as they have been instrumental in tracking the movements of the Western conifer seed bug *Leptoglossus occidentalis* Heidemann (Hemiptera: Coreidae) across England (Malumphy *et al.*, 2008). – JOHN BADMIN, Coppice Place, Selling, Kent ME13 9RP.

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OBITUARY



PAUL ANTHONY SOKOLOFF
1946–2012

Paul died in Saint Christopher's Hospice, Bromley on 26th November 2012 at the age of 66 after a short illness. He was elected to the Society on 25th November 1971 and was respected for his considerable skill in the field and his encyclopaedic knowledge of the Lepidoptera. Paul was always busy. He contributed to nearly all of the entomological societies and publications in a number of roles but mainly as editor, and he frequently worked for several at the same time.

Much of Paul's work was dedicated to supporting the British Entomological and Natural History Society. Ordinary members of Council may serve for a period of two years only and Paul was a member from 1977–1978 and again from 1980–1981. From 1996 to 2012 he was a member of the editorial and advisory panel where his wit and wisdom played no small part in ensuring the smooth-running of the Society. In 1983 Paul was invited to become Vice-President, leading to President in 1984. He very much enjoyed his year of office and, in his Presidential Address – Topical Remarks, observed that:

“The pleasure afforded by this unexpected honour soon became tinged with a faint horror that I would be expected to address this august body.”

He need not have worried; his Presidential address ‘An Introduction to the Gelechiidae’ was a well-received paper that shed much light on this overlooked family. The address covered the early stages and main characteristics, such as typical wing shape and markings, and was followed by an account of global pest species. The twelve British species in the genera *Teleiodes* and *Teleiopsis* were covered in an authoritative and detailed appendix. The adults of these genera were illustrated in the *Proceedings* by, in Paul's words, “. . . magnificent colour paintings” by E. S. Bradford. At the time there was little literature covering the British Gelechiidae and the address was the first of an occasional series on this family. Two more papers written jointly with Eric Bradford followed. A further 31 species were covered and the papers were published in the Society's *British Journal of Entomology and Natural History* in 1990 and 1993.

For many years Paul contributed to the annual exhibition, usually showing both micro and macrolepidoptera, and often Coleoptera and other orders as well. He ran well-attended field meetings in his home county of Kent and was a regular supporter at many others. He was a good friend to the many entomologists who knew him and always generous with his time and knowledge.

In the 1970s and 80s regular fortnightly indoor meetings were held at the Alpine Club. These could be a little formal; they would start with announcements, followed with members' exhibits from the floor and usually concluded with a guest speaker. Paul attended these meetings regularly and few passed when he was present and failed to show an exhibit. When the President invited him to speak a feeling of anticipation would permeate the room. It might be an unusual observation or a tale of entomological woe about a brood of larvae that failed to thrive, but both would be recounted with the wry choice of words and sense of humour so typical of Paul, that captured the situation exactly and lifted the atmosphere perceptibly. He will be sorely missed.

COLIN HART

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Coming from the Midlands down to Kent in the early 1970s one of the first entomologists I was introduced to was Paul Sokoloff who immediately made me feel at home. Little did I realise that much later he would be part of the editorial team of the *British Journal of Entomology and Natural History* when I took over the editorship in 2002. We used to meet at the newly-formed Kent Lepidopterists Group meetings organised by Eric Philp at Maidstone Museum. After a few talks from the good and the great we would trip over to the pub opposite for a jar or two and carry on our conversations. It was evident even then that Paul was a marvellous raconteur

capable of keeping his audience's attention until he delivered his final bon mot. Lots of wonderful stories of entomologists' escapades. The camaraderie in those days was great, and Linda, his wife used to come along as well.

The venue subsequently moved to the Queen's Head public house at Boughton-under-Blean, which just happened to be opposite the home of fellow BENHS microlepidopterist, Ian Watkinson. These regular Lepidopterist's meetings were so much of a success, that Paul and Ian and others contributed to a wall display which proudly hung in the back room of the pub, with set examples of Kent's rare and endemic Lepidoptera, such as the Silver-studded blue *Plebejus argus* ssp. *cretaceus* Tutt from Dover, Grass Eggar, *Lasiocampa trifolii* ssp. *flava* Chalmers-Hunt and Pygmy Footman *Eilema pygmaeola pygmaeola* (Doubleday) from Dungeness and the Long-tailed Blue, *Lampides boeticus* (L.).

After our meetings in the pub we would traipse across to Ian's house to party, suffice to say that Ian specialised, even graduated in, making beer and cider. Serious entomological discussions took place and many a Kent Lepidoptera field meeting was hatched here. There was even the added excitement one year of discovering a couple of specimens of the Ni moth *Trichoplusia ni* (Hübner) at the window during a large influx of autumn migrants. By this time Paul was becoming more involved in the running of the Amateur Entomologists' Society and as editor of the *Entomologist's Record and Journal of Variation*. This brought his editorial and managerial skills to the fore, at a time when he was moving up the managerial ladder at Bromley College and he could be equally forceful or discreet depending on the occasion. I remember Paul recalled that his powers of discretion were thoroughly tested when on one occasion he returned to Steve Whitbread's house on the Isle of Grain after a long night's moth trapping to find Christina, Steve's Swiss wife on the doorstep in her nightie wanting to know where he had been all night. "Don't you know it's our honeymoon?" she asked. Paul ever the diplomat knew instantly this was the time to retreat gracefully and not to explain that in fact they had had a brilliant night recording micromoths. He was tempted though.

Paul was a longstanding member of the Kent Field Club and used to lead the occasional lepidopterists' field meeting. Jan Hendey, KFC bryophyte recorder and fellow lecturer at Bromley College remembers Paul's earlier days. 'As a teenager Paul took a job as a technician at Burroughs Wellcome Laboratories in Beckenham. With most of their technicians, he came on a part-time day release course to Bromley College of Technology. He was a first class student and over a number of years progressed through our courses to gain an MIBiol. During this time, he took a vacancy which arose in our department for a technician. At last, every instrument in the department worked properly as Paul serviced them and found out how they worked. We were an expanding Department of Life Sciences and he applied successfully for a lecturing post. Again he progressed through the ranks until he became a Principal Lecturer and Deputy Head of Department.

I occasionally overheard his lectures in Cell Biology as my office was in a former storeroom at the back of one of the labs. I thought "lucky students" as his well-known wit often provoked much laughter. They must have found it easy to learn from him. On a lighter topic, I remember how the cleaners were wary of doing his office, as often they found a tank containing some creature with too many legs; a large black scorpion really scared them. Being in early, I had to offer reassurance'.

He was also a member of the local Orpington Field Club and as Recorder for Lepidoptera would give a lecture every two years or so, usually on butterflies or moths. Again the wit flowed; this is what members said they would miss when his death was announced.'

Paul joined the Amateur Entomologist's Society in 1969. He was elected to Council in 1975, where he remained until his death. He was Honorary Secretary from 1976–1980 and then President of the Society from 1981–1982, an honour he greatly appreciated. For many years he compiled the Index to the Society's journal and assisted with other editorial duties. He even managed to find time to write two volumes of *The Amateur Entomologist Series*: No.16, Practical Hints for collecting Microlepidoptera (1980) and No. 19, Breeding the British and European Hawkmoths (1984). He was invited to be editor of the *Entomologist's Record and Journal of Variation*, a position he held from 1985–1995.

Paul's late climb up the educational ladder meant that he was particularly interested in providing others with the opportunity of undertaking further education studies either as part of their business training or in evening classes so that they had the opportunity of progressing as he had. His interests led him to join BTec as an Adviser in 1986, a company providing GCSE and A level examination papers and National and Higher National Diplomas for the whole of UK. He was Director and Policy adviser of Edexcel (formerly Btec) when he retired in 2006. This role involved him in extensive negotiations on educational policy and exam and course structures with ministers and civil servants. One day I was lucky enough to listen to Paul on the BBC's Today Programme having to explain to a certain John Humphrys the reasons how a set of examination papers had unfortunately gone astray and how Edexcel had resolved the situation. Many a politician and even a former head of the BBC have succumbed to John's interrogations, but Paul's polite, succinct replies left Humphs speechless: 5 – 0 to Paul. I must admit I went around with a big smile on my face for the rest of the day and that is how I wish to remember Paul – with a smile on his face. His expertise and valuable advice on the editorial panel will certainly be missed.

JOHN BADMIN

Cairngorms Nature Action Plan

Members of the Society have been invited by the Cairngorms National Park Authority to comment upon the new Cairngorms Nature Action Plan which replaces the Cairngorms Local Biodiversity Action Plan.

Whilst the formal consultation period for the plan and the Strategic Environmental Assessment unfortunately ends in February 2013 we are advised by the Officers responsible that any constructive comments by members even after this date will be considered and of value. However because of the print and launch schedule it will not be possible for recommendations to be recognised in the document, though they will be given full consideration throughout the plan's delivery.

Two broad areas can be responded to, firstly the plan itself, a copy of which can be obtained via the website on <http://cairngorms.co.uk/look-after/cairngorms-nature-action-plan> and secondly opportunities for local people or visitors to get involved via Cairngorms Nature which will be open to everyone who would like to become a member.

Comments and enquiries should be forwarded directly to Andy Ford, Cairngorms Nature manager on 01479 870558 or via e-mail at andyford@cairngorms.co.uk

BENHS CONSERVATION WORKING GROUP

FIELD MEETINGS

National Moth Night, Borough Fen Duck Decoy, Newborough, Cambridgeshire, 15 May 2010

Leader: **Paul Waring**. – This meeting was advertised to the BENHS, the Northamptonshire Moth Group and the Moorfields Pony Club, as well as to various friends and mothing contacts locally and was the leader's contribution to National Moth Night for 2010. This report is for both the BENHS and the National event. The BENHS meeting commenced from 19.30h with the setting up of five light-traps in various places on or near to Borough Fen Duck Decoy, Newborough, near Peterborough, prior to dusk nearly two hours later. The evening part of the meeting attracted about twenty people, although no BENHS members other than the leader. The following morning we arranged for the inspection of the moth-traps to coincide with the start of an open day at the Decoy, with the result that the catches of moths were seen by well over fifty people.

The meeting was preceded by several weeks of predominantly sunny, dry but cold days, with cool northerly winds almost constantly. The early spring emergence of Quaker moths *Orthosia* spp. had come to an end at least a fortnight before the meeting and the emergence of later spring species had been delayed by the cold weather. Catches in the leader's garden trap had declined to a handful of moths per night due to the cold nights so the leader knew he would need to operate a number of light-traps to have much chance of providing a reasonable range of species for inspection by those attending the meeting.

As expected, the night of the meeting was one of that run of cold nights and the leader was made aware from conversations, e-mails, phone calls, newsletters and websites that many moth recorders elsewhere had a disappointing night with very small catches. This is frequently the case in mid-May. For over thirty-five years the leader has been light-trapping during May and has noticed that there is a lull after the large numbers of early spring moths in March and April, and that numbers and night temperatures can only be relied on to increase substantially in late May. Anticipating that moths would be few on this date when compiling the Field Meetings Programme months earlier, the leader was certainly not going to travel far from home for National Moth Night. He selected the nearby Borough Fen Duck Decoy as a suitable site for several reasons, not the least of which was that it is only 5km north-east of his home.

By way of introduction, this site and its moths have been described in "The history of Borough Fen Decoy" by W. A. (Tony) Cook and R. E. M. (Rick) Pilcher, published in August 1982. The list of moths for this site was compiled by Rick Pilcher, based on a number of light-trapping visits he made in the 1970s. The book was published seven years before Rick died, aged 86, in 1989. Intrigued by the presence on the list of a number of rare species, particularly the Bordered Gothic *Heliophobus reticulate* (Goeze), the leader made a number of mothing visits to this site over the years since settling in the Peterborough area in 1987. These visits included searches for soapwort *Saponaria officinalis* and for other larval foodplants, and suitable habitat, for the Bordered Gothic, without success (see Waring, 2004a & 2006); the discovery of caterpillars of the Sloe Pug *Pasiphila chloerata* Mab. on old blackthorn *Prunus spinosa* growing by the lake (Waring, 2004b); rediscovering the Red-tipped Clearwing *Synanthedon formicaeformis* (Esper) on this site (see Waring, 2005); and filming part of a documentary on moth-trapping here for television (in

2007, Tales From The Country, programme 25, broadcast in 2008 and several times subsequently including in 2012).

Following a particularly enjoyable light-trapping session at the Decoy with Michele Franks and the site manager Ivan Newton, on 11 August 2009, in which two Red Underwing *Catocala nupta* (L.) were found in perfect condition at rest on the tool-shed on our arrival at 14.00h, and having recorded a Dusky Thorn *Ennomos fuscantaria* (Haw.) and a dozen more frequent species of macro-moths to a single actinic trap left out on site all night, we decided to adopt this Decoy site for a series of BENHS field meetings over the following years. The aim of this was simply to visit at a different time each year, hopefully with a number of light-traps, to update the list of moths known to occur on this site. The Decoy is an island of wooded and lakeside habitat in a sea of fairly intensively farmed agricultural land, which also features some old ditches, dyke banks and hedgerows.

For this first BENHS meeting, on 15 May 2010, the leader had made arrangements to run four light-traps all night in and around the Decoy. The traps and trap-sites were: A – a standard Robinson trap fitted with a 125W mv bulb (MB/U model) at the leader's large village garden (map ref. TF 16403 03337 $\pm$ 4m), B – an identical trap at the edge of the Decoy on a cable from the adjacent farm-house (map ref. TF 19799 08150 $\pm$ 5m), C – an identical trap in the vegetable garden of the farm-house at Moor Farm adjacent to the Decoy (map ref. TF 19262 07665 $\pm$ 6m), D – an actinic trap operated under poplars on the Decoy site (map ref. TF 20098 08078 $\pm$ 5m) and E – an actinic trap operated at Green Banks, Little Dog Drove, Holbeach St Johns, (map ref. TF 33876 17287 $\pm$ 5m) courtesy of Michele Franks, who attended the meeting.

The temperature at dusk was only 8°C. Fortunately it had not fallen any further by 22.30h when the first round of the traps for the night was made. Shuttle-shaped Darts *Agrotis puta* (Hbn.) were the most numerous species in the traps, with just a few other noctuid species, most represented by only one or two individuals. We also found a mating pair of Common Swift *Hepialus lupulinus* (L.) near trap B. At this stage our group numbered about twenty people, including the girls from the Moorfields Pony Club, with people easily out-numbering the species of moths in the traps! All traps were operated all night, and in the morning it was a much better story, with a total of 25 species for the entirety of National Moth Night. The largest catch was 29 macro-moths of 13 species in Robinson trap C in the garden of Moor Farm, adjacent to the Decoy. This included three Powdered Quaker *Orthosia gracilis* (D. & S.), which the leader was pleased to see because this species is only seen occasionally at his home nearby, and not in every year. His garden trap A on this same night produced a catch of 24 macro-moths, but of only four species! Eighteen of the moths were Shuttle-shaped Darts! The most interesting catch however was in the actinic trap D owned by Martin Pride and deliberately placed under poplars at the Decoy. This trap caught only five macro-moths, of four species, but these included two freshly emerged Chocolate-tip *Clostera curtula* (L.), a Swallow Prominent *Pheosia tremula* (L.), a Herald *Scotopteryx libatrix* and a Poplar Hawk-moth *Laothoe populi* (L.). These five moths were the only individuals of these species recorded that night. All have caterpillars which feed on poplars. These moths themselves were amongst the most attractive of all the species caught, though we also had the Cinnabar moth *Tyria jacobaeae* (L.), Muslin Moth *Diaphora mendica* (Clerck), Brimstone *Opisthograptis luteolata* (L.) and Green Carpet *Colostygia pectinataria* (Knoch) in the other catches. The leader had of course aimed to catch a Poplar Hawk to impress the public with a really large moth. It was just as well the traps were kept running all night to catch these species because in the morning well



Fig. 1. The Leader with Tony Cook, at Borough Fen Decoy on 16 May 2010. Tony co-wrote "The History of Borough Fen Decoy" (1982) with Rick Pilcher. Also present are Kirsty Waring and Martin Pride.

over fifty people examined and photographed the moths as part of the open day at the Decoy. During the event it was a great pleasure to meet Tony Cook, co-author of the above history book about the Decoy, and to discuss with him his memories of Rick Pilcher's mothing activities (Fig. 1).

Earlier in the day the leader had conducted his weekly transect count which monitors the Four-spotted Moth *Tyta luctuosa* (D. & S.) at Werrington Brook Drain (map ref. TF 15855 03216), on the other side of Peterborough from the Decoy, to make certain of recording at least one Nationally Scarce species for the National Moth event, as well as adding a few additional day-flying moths to the total list for the day! The transect walk was set up in 2000 and has been walked by the leader from late April to August every year since then. The transect count on 15 May went well. It was the warmest afternoon of a cool week, with a mild northerly wind. The leader had four sightings of the Four-spotted moth on the transect, all certainly of different individuals, two well separated on the transect and two more in view simultaneously. A single Burnet Companion *Euclidia glyphica* (L.) and a single Mother Shipton *Callistege mi* (Clerck.) were also seen. All these moths were in freshly-emerged condition and at the start of their flight seasons locally. Also found was a group of about thirty black first instar caterpillars of the Emperor moth *Saturnia pavonia* (L.), feeding on leaves by the batch of eggs from which they had hatched. This was on a stem of Dewberry *Rubus caesius*. Three Grizzled Skipper butterflies *Pyrgus malvae* (L.) and two Common Lizard *Zootoca vivipara* (Licht.) were amongst the list of other species seen here. So that was a good start to the day.

The leader would like to thank the following for all their help and assistance in making this National Moth Night event as productive and enjoyable as it was: Ann and Rodney Fletcher (the owners of the Decoy), Ivan Newton (site manager at the Decoy), Judith and Andrew Jacobs (owners of Moor Farm, for providing safe places to leave traps out overnight there), Michele Franks (for operating her light-trap at Green Banks, Little Dog Drove, Holbeach St John's, and Martin Pride for bringing along his actinic trap. Copies of the complete field records from this meeting have been supplied to Mark Hammond of the Northamptonshire Moth Group, working closely with John Ward, County Moth Recorder for Northamptonshire, and to Mark Tunmore of Atropos magazine which is the founder and co-organiser of National Moth Night with Butterfly Conservation.

Further BENHS field meetings are planned at the Decoy, and indeed two more have taken place since that described above. These will be reported separately.

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Roydon Common, New Forest, Hampshire, 26–27 July 2010

Leader: **Paul Waring**. – A night meeting in the New Forest, Hampshire, can always be relied upon to attract a good number of moth-trappers. Fifteen people attended the BENHS field meeting at Roydon Common, near Setley, Hampshire, on 26th July – a warm dry night. The site is a nature reserve of the Hampshire & Isle Of Wight Wildlife Trust, to which we are grateful for their permission and cooperation in holding this meeting (Figs. 1 & 2). Species of moths seen included a Dark Crimson Underwing *Catocala sponsa* (L.) to wine-ropes, a Light Crimson Underwing *Catocala promissa* (D. & S.) in a light-trap, Waved Black *Parascotia fuliginaria* (L.), Slender Brindle *Apamea scolopacina* (Esper), Black Arches *Lymantria monacha* (L.), and from the open heath a single Purple Bordered Gold *Idaea muricata* (Hufn.), plus Round-winged Muslin *Thumatha senex* (Hübner), Horse Chestnut *Pachycnemia hippocastanaria* (Hübner), True Lover's Knot *Lycophotia porphyrea* (D. & S.) and Beautiful Yellow Underwing *Anarta myrtille* (L.). We also observed the striking large yellow and black crane fly *Ctenophora ornata* Meigen by a Robinson trap in open heathland while recording the catches in the moth-traps in the morning. This fly is a Red Data Book species which we have found and reported a number of times on BENHS field meetings involving light-trapping in the New Forest. A Nightjar *Caprimulgus europaeus* L. was churring and seen flying throughout the evening. A search was made using hand-held torches by night for caterpillars of the endangered Reddish Buff moth *Acosmetia caliginosa* (Hübner), following up an attempt to establish a population of the moth here which involved the release of 495 caterpillars



Fig. 1. Mike Boxall inspecting the overnight catch in the Robinson mv light trap, Roydon Common, SU30970 00135, 2010. Photo: P. Waring.



Fig. 2. A view east of the mv trap and lower down the valley, Roydon Common, 2010. The overhead cables run approximately North-South. Photo: P. Waring.

on 19 July 2001, many of which were nearly ready to pupate at the time. The release was part of the English Nature Species Recovery Programme. Unfortunately no larvae were found here in 2010. The leader would like to thank everyone who attended and supported this meeting and took part in the nocturnal search for caterpillars, which covered a large proportion of the original release site. Special thanks to John Durnell and Mike Boxall of the Hampshire & Isle of Wight Wildlife trust for arranging the site visit.

Abbotstone Down, nr Alresford, Hampshire, 8 July 2011

Leader: **Stephen Miles**. This was advertised as a joint meeting between the British Entomological and Natural History Society and Alton Natural History Society. This site had been trapped extensively by Eddie Sadler, Edward Pelham-Clinton, Denzil Ffennell and Russel Bretherton in the period 1951 to 1980 but there are only ten moth species recorded from here post 1981 (see *The Butterflies & Moths of Hampshire and the Isle of Wight* (1974) and *Moths of Hampshire and the Isle of Wight* (2001)). Permission was obtained from the site owners, Hampshire County Council (HCC) for the use of generators and moth light traps. Unfortunately only one other member of the BENHS turned up for this meeting other than the leader and no one from the ANHS attended at all. The earlier rain and the recent coldness of the nights probably influenced the low attendance on the night. Stephen Miles located his 40-watt actinic light in the grassland adjacent to the car park, surrounded by woodland and calcareous scrub. Tony Dobson brought his 6-watt actinic trap, which he placed in the main calcareous grassland clearing of the site. The results from these two traps combined with Tony's dusk sweeping fieldwork assured that a good number of moth records were made. Forty-one moth species were recorded in total, of which six were new micromoth records and one new macro-moth for the site. The remaining species had been recorded in the 1950s–1970s period, so it was interesting to note their continuing presence.

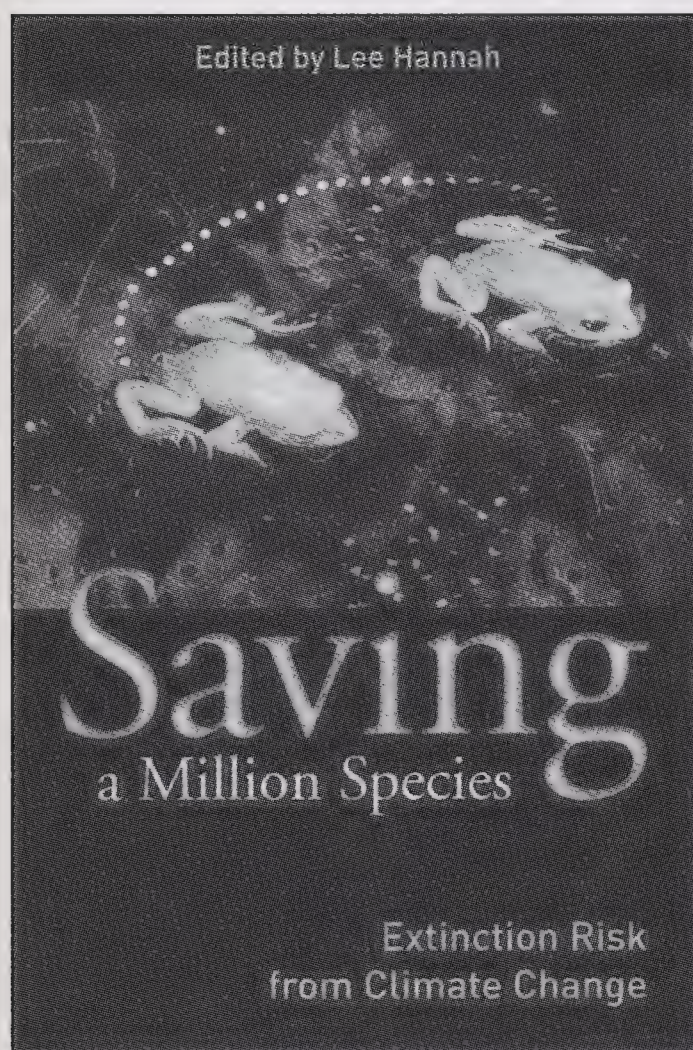
In order to maintain the richness of the plants and butterflies in the surrounding short grassland sward Hampshire County Council intends to actively graze this Site of Interest to Nature Conservation (SINC) and the object of the meeting was to record the moth species present before grazing was resumed. Seventeen of the recorded species were common grassland plant feeders, so if they were breeding here, grazing is likely to affect their abundance. However owing to their common status the impact of grazing on this one site is unlikely to affect their status in the general area.

Sweeping the grassland in the early evening Tony obtained a single white-line snout, *Schrankia taenialis* (Hübner), the third North Hampshire (VC 12) record for this Nationally Notable species which has also been recorded in this tetrad previously. The larval foodplant of this species is unknown in the wild in this country, so the effects of grazing, if the moth is breeding here, cannot be assessed. It will be worth revisiting this site again in July in future years to determine whether this local moth is surviving.

The trapping period came to an end at approximately 1.00h as the temperature was dropping, having reached 15°C by our departure time. The only new macro-moth to the site, the white-spotted pug, *Eupithecia tripunctaria* (H.-S.) was recorded by Tony Dobson during his evening sweeping.

Thanks go to Bradley Brown and other staff of the Countryside Service of Hampshire County Council for consent to trap moths at his site.

BOOK REVIEWS



Saving a Million Species: Extinction Risk from Climate Change. Edited by Lee Hannah. Island Press, 2012. Softback 417pp, £22.00. ISBN: 978-1-59726-570-6.

This book is a compilation of 20 fully referenced chapters authored by leading authorities from around the globe. The chapters are grouped into six main themes: Introduction (chapters 1–3), Refining First Estimates (chapters 4–5), Current Extinctions (chapters 6–8), Evidence from the Past (chapters 9–12), Predicting Future Extinctions (chapters 13–18), and Conservation Implications (chapters 19–20). Given my research interests in palaeoarachno/entomology I obtained a copy for review. Unfortunately, coverage of past extinctions over deep time or the potential climate change and extinction effects on terrestrial arthropods were poorly covered. Given that our current biodiversity is the result of approximately 3.8 billion years of evolution

(with 99.99% of all species ever to have existed on the planet gone extinct, as cited in chapter 12), and with the majority of known species consisting of terrestrial arthropods such as insects and arachnids (consequently these groups are at greater risk of extinction), I found this a little surprising. In chapter 10, which deals with climate change in the Tertiary it states that insect body fossils are very rare and that plants and mammals are better documented. This is not true, insect fossils are highly abundant, numbering in the hundreds of thousands (if not more), particularly as fossils preserved in amber where they provide unique insights into extinct tropical forest ecosystems of the past (Penney, 2010), including from the Paleogene of Europe. Likewise, in chapter 11, which concerns Quaternary extinctions, all data presented are based on the megafauna with no reference to insects, despite the extensive literature on this topic (Elias, 2009). Nonetheless, this is a very interesting and important book.

The main title is a little misleading as it kind of gives the impression that we know how many species are at risk and that we have an idea of how to resolve this problem. In addition, when climate change is considered along with the inextricably linked habitat loss the number of species at risk of extinction is clearly in the millions, even at the lower end of global species counts (chapter 20). Thus, a more appropriate title may have been 'An inordinate number of species are currently at risk of extinction, but we do not know how many and we do not know what to do about it.' Herein lies the importance of the book.

Climate change and extinction risk is an immediate and important threat, with subsequent implications for humankind globally. Although scientists (and laypersons) can see it happening, at present they are unable to quantify it due to insufficient data and methodologies, and they do not really know what to do about it. This is the message that comes out of most of the chapters. I suspect that such large scale, powerful and dynamic processes are ultimately outside of

our control and we should not delude ourselves into thinking that we can do a great deal about it over the geological, long-term. Nonetheless, we can make predictive models for the short term and methods for doing this are discussed (e.g. range shifts as opposed to extinction). There is also a significant human impact both in terms of speeding up climate change and also with regard to land use change/habitat loss that will interact in ways that exacerbate extinction rates. Although this is noted as extremely important there is no chapter specifically on this topic. The book does discuss positive human influence (in the light of limited finance) through policy making, but I feel it would have been beneficial to remind everybody who reads it that just a slight change in their own behaviour can help reduce some human impact effects and that we should all be conscientious about doing this whenever possible. Furthermore, we need to act on this now because, as stated in the introduction, the anthropogenic effects we set in motion now may take many centuries to be fully realized.

This book highlights a very important issue of global concern and anybody who can read it should do so. Ultimately the book aims to stimulate discussion and directed research (chapter 19), although research should not be a substitute for action (chapter 14). The book presents evidence from both the aquatic and terrestrial realms that it is no longer a question of whether or not we are in the midst of a mass extinction event, we are, the question now is, what can we do about it? As noted in chapter 15, one of the defining characteristics of our times is that there is nowhere on our planet that humans have not significantly impacted. Freshwater habitats will no doubt suffer in the future as a result of engineering responses (e.g. dam building) causing 'water stress' as a result of human responses to climate change (chapter 17). Policy makers will benefit through gaining an understanding of the socio-political issues raised, academics may find avenues to contribute to the ongoing research effort (there are many gaps in our knowledge, in terms of taxonomic diversity, distribution, phenology, ecological interactions in addition to modelling/assessment methodologies – many current models do not include biotic interactions, chapter 18) and the general public will generate a much-needed awareness of the issues, which may in turn help motivate the policy makers. This needs to happen sooner rather than later given that institutional change at most levels is slower than climate change and climate change already has a head start (chapter 19). Indeed, we are already committed to substantial change in climate and biological reorganization as a result (chapter 20).

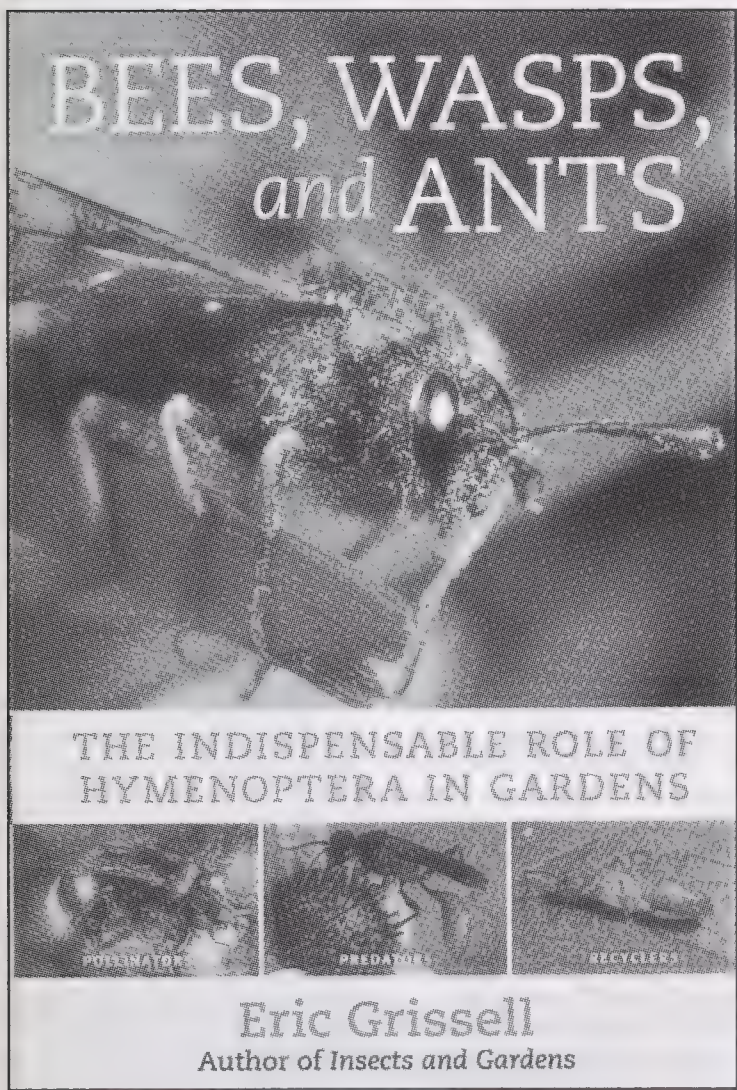
The book ends with a brief biography of each contributor and an index of 11 pages. Although written by academics it will be accessible to the educated layperson, although the extensive equations in chapter 5 will presumably be beyond the comprehension of many. There are two important issues that I feel should have been included but were not. First, the potential for ecotourism as a means of species and habitat conservation. There is obvious potential for this approach in conservation programmes, but it is without doubt a double-edged sword and the discussion of some case studies would have been appropriate and informative. Second, the book was written by authors in the developed world and aimed at a similar readership. In reality, much of our threatened biodiversity lies in the tropics of the developing world, where both (often) ill informed governments and individuals may have very different priorities when it comes to considering their immediate future versus long-term sustainability and conservation. In some cases, this may make the difference between an individual feeding their family or not, or providing a fire for warmth during the night.

On the whole the production quality is good with very few typos or inconsistencies. Figure 16-1 on page 287 would have benefited from being slightly larger, possibly occupying a single page in landscape orientation.

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DAVID PENNEY



Bees, wasps and ants: the indispensable role of Hymenoptera in gardens by Eric Grissell. 335pp. (Timber Press, London, 2010). Hardback £17.99. ISBN-13:978-0-88192-988-1.

The author of this book, Eric Grissell, is well-known for his studies on predatory and parasitic Hymenoptera, having worked as a taxonomist with the Florida Department of Agriculture and then the United States Department of Agriculture for over thirty years. He is a former editor of the *Journal of Hymenoptera Research* and every alternate year runs a week-long workshop on parasitic wasps. The aim of this book is to describe the unique features of the Hymenoptera, the ecosystem services they provide and how to encourage them to survive and flourish in a garden environment. His writing style is easy to follow and his knowledge encyclopaedic. The preface is a guide to key taxonomic works and courses on Hymenoptera around the world, and the UK gets fair mention with books on bumblebees by Edwards and

Jenner, (2009), Prys-Jones and Corbet (2011), solitary wasps by Yeo and Corbet (1995) and ants by Skinner and Allen (1996), for starters. This chapter is therefore a very useful starting point if you are intending to study Hymenoptera anywhere abroad. He is very keen on mentioning websites and directs readers to the Bees, Wasps and Ants Recording Society for additional information, though not to our Society's and our specialised identification courses. The author's course has been expanded and renamed "The Hym Course" and takes place at different locations in the USA.

The first part, comprising four chapters, is an overview of bees, wasps and ants. This is really packed with interesting, sometimes thought-provoking information on Hymenoptera. The section on taxonomy is titled 'The main divisions within Hymenoptera and why we won't use them', a real can of worms, as modern cladistic research shows that the two main lineages, of sawflies (suborder Symphyta) and the rest - parasitic wasps and bees, wasps and ants (suborder Apocrita) are no longer correct and these terms are predicted to disappear in due course. Bees aren't bees either of course these days, just specialised wasps. Currently, bees are divided into

seven families worldwide, but increasingly it seems that all bees should be recognised as belonging to a single family. The author steers us through all this ‘controversy’ with a light touch.

There is a useful section on feeding strategies, from plant feeders through predators to parasitoids and parasites, covering endo- and ectoparasitoids, cleptoparasitoids, idiobonts, koinobonts and inquilines. The section titled “Ovipositor – where is thy sting?” introduces the reader to the many functions of the female appendages initially developed for egg laying. The author stresses the fact that it is only female wasps and bees (or is it just wasps?) that are responsible for causing a nuisance and stinging us all. Species described in the text are backed up by 144 first-rate colour photographs.

The major part of the book is devoted to Hymenoptera in gardens. It is trendy to have wildlife gardens – wildlife being a euphemism for two primary groups of animals: birds and butterflies. Seldom do we hear mention of frog gardens or lizard gardens, simply because of the tendency to accept birds and butterflies, and possibly dragonflies as being the only groups which are ‘garden-worthy’. While butterflies can be attractive in a garden, the author stresses in reality, bees, predatory wasps, parasitoids and even ants are much more beneficial to a garden’s health than are butterflies. Conversely, wasps, ants and even bees are generally greeted with the question “How do I rid my garden of these threats?” The better question to ask might be “How do I live with or encourage more bees, wasps and ants into my garden?” (Clearly an uphill struggle if my interviews on Radio 5 on the plagues of ants supposedly darkening the skies over London are anything to go by). The author stresses the four basic services Hymenoptera provide in gardens: food to attract birds, lizards and frogs; balance to maintain their own ecosystem; pollination to produce seeds, fruits and vegetables; and recycling of organic waste. The last service includes not only recycling of nutrients (e.g. movement of dead or living animal and plant tissues into the soil) but also the improvement of soil by aeration. All provided free of charge.

The author then provides sound advice on how to attract beneficial Hymenoptera into gardens: the best choice of flower species – see *Ecoregional planting Guides*, *Plants attractive to Native bees* and *Plants for native bees in North America* (c/o the Xerces Society) and similar lists found on the Bumblebee Conservation Trust and Bumblebee.org websites in Europe. Other factors to consider include floral diversity (size, shape, colour and fragrance), the implications of using single, double and pollenless flowers, floral phenology (i.e. seasonality) and planting large versus small patches.

In the final part the author describes the lives of garden Hymenoptera in greater detail with chapter headings: ‘The Garden Cows: sawflies’; ‘The Garden Police: true parasitoids’; ‘The Garden Wolves: predatory wasps’; ‘The Garden’s Pollinators: bees’ and ‘The Garden’s Recyclers: ants’. The author’s enthusiasm for Hymenoptera of all sorts living in gardens is highly laudable, vespids included, but trying to offset the potential damage that conifer sawflies are likely to cause by explaining this may mean more birds and mice visiting your garden to dine on overwintering pupae is a rather tenuous benefit to say the least.

All in all, the author provides a very interesting, entertaining and readable account of the Hymenoptera north of Mexico (naturally covering more groups than occur in the British Isles). The last chapter, ‘Some Useful Websites’, (10pp), is extremely useful and a very good reason for buying the book.

JOHN BADMIN



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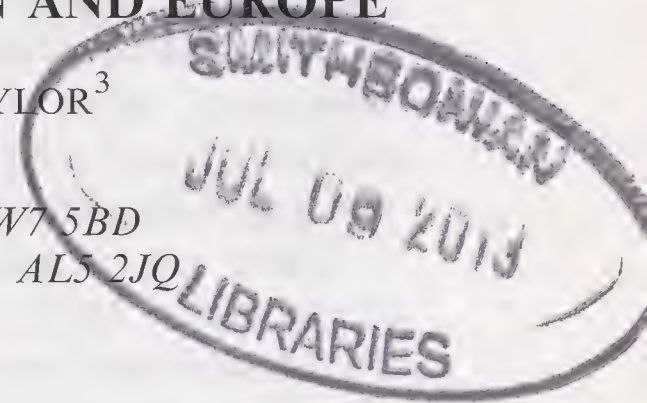
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Cover photograph: The Red Underwing *Catocala nupta* (L.), Boughton, Kent, 2012. Photo: Peter Maton.

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***ERICOLOPHIUM HOLSTI* (HEMIPTERA:APHIDIDAE), A NEW RHODODENDRON-FEEDING APHID FOR BRITAIN AND EUROPE**V. F. EASTOP¹, R. L. BLACKMAN² AND M. S. TAYLOR³¹*Deceased*²*The Natural History Museum, Cromwell Road, London SW7 5BD*³*Rothamsted Insect Survey, Rothamsted Research, Harpenden AL5 2JQ***ABSTRACT**

Four winged specimens of *Ericolophium holsti* (Takahashi), a *Rhododendron*-feeding aphid new to Britain and Europe, have been identified from Rothamsted suction trap samples collected in southern England.

INTRODUCTION

During the past 80 years two *Rhododendron*-feeding aphids of North American origin have been found in the UK, and have subsequently become widely distributed in Europe. *Illinoia azaleae* (Mason), originating from eastern North America, was first recorded in England in 1936, and now occurs on rhododendrons and azaleas in many other European countries as well as being in South Africa, Australia, New Zealand and Argentina. All the British records of this species are from England (Blackman, 2010). A second *Rhododendron*-feeding species of this genus, *Illinoia lambersi* (MacGillivray) from western North America, arrived in Britain in about 1970, and is now recorded from all parts of the British Isles (including the Isle of Man), as well as being widely distributed in Europe (Coeur d'acier, Pérez Hildago & Petroviæ-Obradoviæ, 2010).

RESULTS

On 31 May 2011 a single alata of a species not previously recorded in the UK was caught in the Rothamsted suction trap (Macaulay, Tatchell & Taylor, 1988) at Silwood Park in Berkshire. It was a fairly large species of the tribe Macrosiphini, and on examination and comparison with specimens in the Natural History Museum (NHM) London collection it was found to have features characteristic of *Ericolophium holsti*, a species described from *Rhododendron* in Taiwan (Takahashi, 1935). In each of June, July and August 2012, three more alatae of *E. holsti* were caught in the suction trap at Rothamsted in Hertfordshire, about 60km away from the Silwood trap, indicating that this aphid probably has now established populations on *Rhododendron* in southern England.

DISCUSSION

Ericolophium holsti was originally placed in *Macrosiphum*, but clearly does not belong in that genus. A new genus *Neoacyrthosiphon* was erected for it by Tao (1963), but this was synonymised with *Ericolophium* by Eastop & Blackman (2005). It has subsequently been recorded from several locations in northern India, where there are many other *Rhododendron*-feeding species of Macrosiphini, described in related and rather ill-defined genera (Chakrabarti, Mandal & Raha, 1983). The alatae of *E. holsti* have several distinctive features that enable them to be easily recognised. The antennae are long and dark, the third antennal segment being particularly long and

bearing a very large number of small rhinaria (often 100 or more) distributed over most of its length. The terminal process of the antenna is however quite short, usually less than twice as long as the base of the sixth segment. These antennal characters, when combined with the elongate oval body shape and long cylindrical siphunculi and long cauda, distinguish the alatae of the new arrival from those of all other British aphids.

There are some discrepancies when compared with the original description (Takahashi, 1935), and with two alatae from Taiwan determined as *holsti* by Takahashi that are in the NHM collection. The tibiae of the UK specimens are wholly dark, and the dorsal abdomen has dusky sclerotic pleural patches, large dark postsiphuncular sclerites, and a dark band across the eighth abdominal tergite. A specimen in the NHM collection from India (Simla, leg. K. D. Verma) has similar but fainter dorsal pigmentation. The darker pigmentation of the British specimens could be the result of development at lower temperature. The cauda is also shorter and thicker than in Taiwanese specimens, but again there are specimens from India that display an intermediate condition.

The only hosts of *E. holsti* identified to species in its countries of origin are *Rhododendron arboreum* Smith and *R. morii* Hayata (Blackman & Eastop, 2006), but it seems likely that it can colonise other species, cultivars and hybrids, including azaleas. If colonies of *E. holsti* are found on *Rhododendron* then the apterae with their pale, dark-tipped cylindrical siphunculi will be easy to distinguish from those of the two species of *Illinoia*, which both have siphunculi darkened and swollen on the distal half, with *Macrosiphum*-like polygonal reticulation on a constricted region distal to the swollen part (see Blackman, 2010). The short antennal terminal process of *E. holsti*, only about twice as long as the base of the last antennal segment, also distinguishes it from both *Illinoia* species, which have the terminal process more than four times longer than the base. Another distinctive feature of the aptera of *Ericolophium* is that, in contrast to the alata, the third antennal segment completely lacks rhinaria, but is thickened on the basal half and has a pronounced outward curve. Apterae of both species of *Illinoia* have 1–6 rhinaria on the basal part of the third antennal segment. Blackman & Eastop (2006) provided a key to apterae of all the *Rhododendron*-feeding aphids.

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MYRMECOPHILES AND OTHER INVERTEBRATE NEST ASSOCIATES OF THE RED WOOD ANT *FORMICA RUF*A (HYMENOPTERA: FORMICIDAE) IN NORTH-WEST ENGLAND

N. A. ROBINSON AND E. J. H. ROBINSON*

*Corresponding author: Department of Biology, University of York, York YO10 5DD
Elva.Robinson@york.ac.uk.

ABSTRACT

Red wood ant (*Formica rufa* L.) nests in Lancashire were surveyed over a three-year period for invertebrates living in the nest material. Obligate myrmecophiles (22 species) and other invertebrates which have a loose or unknown association with ants (over 70 species), were found in the nests. Invertebrates recorded included a British Action Plan ant species *Formicoxenus nitidulus* (Nylander), wasps, beetles, flies, springtails, woodlice, millipedes, centipedes, spiders, pseudoscorpions, mites and worms. The data demonstrate that even a relatively isolated population of *F. rufa* at the northern limit of its British range harbours a rich invertebrate fauna. The conservation of *F. rufa* thus protects not only this ‘near threatened’ species, but also provides essential habitat for the species dependent on it. The natural history of some of the recorded myrmecophiles and nest associates is discussed in relation to their status within the ant nests and with respect to the conservation implications for these fragmented populations.

INTRODUCTION

Ant nests provide a stable, food rich and temperature controlled environment, utilised by a wide range of invertebrate mutualists, commensals, parasites and opportunists (Kronauer & Pierce, 2011). In Britain, the largest ant colonies are formed by wood ants (*Formica* spp.). The last broad study of their nest associates was carried out by Donisthorpe almost 100 years ago (Donisthorpe, 1927). The current study aims to provide an up-to-date survey of the myrmecophiles and nest associates of the red wood ant *Formica rufa* L. in north-west England.

The term myrmecophile is used here to mean an organism that is ‘dependent on ants at least during part of its lifecycle’ (Wilson, 1971). Such a broad definition includes, for example, some aphids tended by ants, but this study focuses on intranidal myrmecophiles. In addition to these ‘true’ myrmecophiles, a vast array of other species can be found in ant nests. Rettenmeyer *et al.* (2011) suggest the use of the term ‘associate’ to indicate that there is some connection between these species. Social insect colonies are referred to by Hughes, Pierce & Boomsma (2008) as “homeostatic fortresses”, i.e. an attractive safe environment to live in, once the defences have been overcome to allow entry. Once an associate has found a way to avoid becoming the prey of the ants, it may live within the nest and benefit from the ants’ exclusion of other predators. Associates may also predate other associates, or may benefit from scavenging within the ant nest, either on booty brought back by the ants or on detritus. In addition wood ants use social thermoregulation, with the result that their nests can provide associates with a more stable and often warmer, environment than the surrounding leaf litter (Rosengren *et al.*, 1987).

Wood ant nests comprise underground chambers, a soil mound and a thatch constructed of pine needles and leaf-litter (Plate 5, Fig. 1). The ants move up and down through this structure depending on season and temperature (Rosengren *et al.*,

1987). Wood ants are scavengers, predators of invertebrates and also tend aphids for honeydew (Sudd *al.*, 1977; Robinson & Woodgate, 2004; Robinson, Tofilski & Ratnieks, 2008). Four species of wood ant occur in Britain: *Formica rufa*, *F. lugubris* Zetterstedt, *F. aquilonia* Yarrow and (very scarce) *F. pratensis* Retzuis. It should be noted that Donisthorpe's 1927 work was carried out prior to the splitting of *F. rufa* in Britain into four species by Yarrow (1955). In Britain, *F. rufa* is polygynous and colonies can persist in the same location for several decades (Robinson, 2005a; Robinson & Robinson, 2008). The populations in the Arnside-Silverdale Area of Outstanding Natural Beauty (AONB) in Lancashire are the northern limit of *F. rufa* in England and stand isolated from other populations in Yorkshire and further south (Robinson, 2001; 2005a). The largest of the AONB's populations is on Gaitbarrows National Nature Reserve, comprising over 100 nests (Robinson & Robinson, 2008). This survey investigated the nest associates of *F. rufa* at this site and four other nearby wood ant sites, from September 2007 to August 2009.

METHODS

The five *F. rufa* populations included in this survey occur on limestone woodland sites: Arnside Knott (SD4477, ca.100 nests), Coldwell Parrock (SD4777, ca.17 nests), Eaves Wood (SD4677; ca.43 nests), Gaitbarrows (SD4877; >100 nests) and Grubbins Wood (SD4478; ca.13 nests). For this study, 16 mature nests were sampled 1–13 times, totalling 47 samples (Table 1). For each sample, two litres of the thatch was taken and spread onto a white surface. The invertebrate associates present were located by visual sorting of the material. Only living invertebrates were collected; dead invertebrates or fragments are likely to be wood ant prey. Large and easily identifiable species were identified in the field. All others were preserved for later identification by the authors or by taxonomic experts (see Acknowledgements). The remaining nest material was returned to the mound. Preliminary trials indicated that the ants reincorporate the material into the nest within a week without this causing any significant disturbance. In 2007–2008, sampling was led by NAR with some assistance from EJHR. In 2009, sampling was led by EJHR following the same technique. The initial plan was to survey for larger invertebrates (insects, isopods, myriapods and spiders), however during 2008 it became clear that smaller invertebrates (mites, springtails) were also numerous in some nests. Some records of these groups were made from August 2008 onwards and they were actively included in all samples made during 2009. As far as possible, species records were lodged with the appropriate national recording schemes, e.g. Bees, Wasps and Ants Recording Society (www.bwars.com); British Myriapod and Isopod Group (www.bmig.org.uk); Collembola of Britain and Ireland (www.stevehopkin.co.uk/collembolamaps). Samples were taken throughout the ants' active period (April–October). See Table 1 for details of sampling schedule.

Species accumulation curves can give an indication of how successful a sampling strategy has been in covering the species diversity present. The data collection differed slightly between the periods led by the two authors, so species accumulation curves were plotted separately, firstly taking the 2007–2008 data collected by NAR excluding mites and springtails and secondly taking the 2009 data collected by EJHR, including mites and springtails which were actively recorded during this period. Unidentified larvae and worms were excluded from both analyses. Additionally, a species accumulation curve was also plotted for the nest that was sampled the most times (Gaitbarrows Nest 13). Curves were plotted in Microsoft Excel 2003.

RESULTS

Invertebrates recorded

Twenty-two species of known myrmecophiles were found in the course of the study and a further 71 species of invertebrate were identified from the nest material (Table 2 and Appendix).

The Shining guest ant *Formicoxenus nitidulus* (Nylander) was numerous in certain nests at one site (Gaitbarrows). Two wasp specimens were found, both determined as probably *Conostigmus formiceti* (Erichson) (Megaspilidae).

Seventeen species of beetle were recorded in the ant nests. The staphylinids were the most abundant family of beetles, by number of species recorded (11/17), numbers of individuals per nest and numbers of nests in which they occurred (see Appendix). Even larval staphylinids were common in some nests in the summer months. Other beetle families represented were the Monotomidae, Ptiliidae and Scydmaenidae. The majority of the beetle species recorded (12/17) are known myrmecophiles.

Two sciarid fly species were recorded, plus one lepidopteran larva and one species of Thysanoptera. The springtails present included the obligately myrmecophilous *Cyphoderus albinus* (Nicolet) which was numerous in some nests on two sites. Nine other species of Collembola were recorded, the commonest of which was *Lepidocyrtus cyaneus* Tullberg.

The common rough woodlouse, *Porcellio scaber* Latreille, was the most common nest associate found and was often very numerous. It was recorded at all five sites, 14

Table 1. Details of nests sampled and sampling schedule.

Site	Nest ID	OS Grid ref	Samples
Arnside Knott	A	SD44977720	Sep08, Apr09
Arnside Knott	B	SD44997728	Sep08, Apr09 ^a
Coldwell Parrock	3	SD47937789	Oct07
Eaves Wood	i	SD46657602	Sep07
Eaves Wood	ii	SD46607600	Sep07
Eaves Wood	iii	SD46607610	Jul08, Sep08
Eaves Wood	iv	SD46807613	Sep08, Jun09
Gaitbarrows	13	SD48137760	Aug07, Sep07 × 3, Apr08 × 2, May08 × 2, Jul08, Aug08, Apr09 , Jun09, Aug09
Gaitbarrows	23	SD48397764	May08
Gaitbarrows	47	SD48257740	Sep07, Oct07, Apr09, Jun09
Gaitbarrows	104	SD47997750	May08
Gaitbarrows	104A ^b	SD47997750	Jun09, Aug09
Gaitbarrows	163	SD48227773	Oct07, Jun08, Apr09
Grubbins Wood	3	SD44507787	Sep07
Grubbins Wood	6A	SD44557791	May08, Jun08, Aug08
Grubbins Wood	7	SD44557799	Jun08, Jul08, Sep08, Apr09, Aug09
Grubbins Wood	17	SD44557788	Jul08, Aug08, Aug09
Totals	16 colonies		47 samples

^a Nest B diminished in size between these two samples, so that in April 2009 the total thatch volume was approximately 2 litres. To avoid severe disruption to the colony, the thatch was not searched, but a staphylinid beetle was collected from the surface of the thatch and is included in the dataset.

^b The colony in nest 104 relocated in late 2008. Nest 104A therefore contained the same *F. rufa* colony as 104.

Table 2. Summary of number of species recorded in *Formica rufa* nests by site and taxon. A full breakdown of the data by species, site and date are given in the Appendix. Symbol + indicates presence of members of the taxon, but number of species is unknown. Note that totals of species recorded from each taxon are not simply sums of the site totals, because sites contained different subsets of the taxa.

	Arnside Knott	Coldwell Parrock	Eaves Wood	Gaitbarrows	Grubbins Wood	Total species
Number of nests sampled	2	1	4	5	4	16
Number of samples	4	1	6	24	12	47
Number of species of:						
Hymenoptera (Formicidae)	0	0	0	1	0	1
Hymenoptera (Megaspilidae)	0	0	0	1	0	1
Coleoptera (Staphylinidae)	3	0	1	10	7	11
Coleoptera (other families)	1	0	1	3	3	6
Diptera	1	0	0	0	2	2
Lepidoptera	0	0	0	0	1	1
Thysanoptera	0	0	0	0	1	1
Collembola (Entomobryomorpha)	1	0	0	8	3	10
Collembola (Poduromorpha)	0	0	0	1	2	2
Isopoda	3	1	4	3	6	8
Diplopoda	2	1	3	9	4	10
Chilopoda	5	0	1	7	3	9
Aranae	0	0	1	2	3	3
Pseudoscorpionida	0	0	1	0	0	1
Acari (Astigmata)	0	0	0	1	0	1
Acari (Ixodidae)	0	0	0	1	0	1
Acari (Prostigmata)	0	0	0	2	1	2
Acari (Mesostigmata)	5	0	4	13	15	25
Acari (Oribatida)	1	0	0	13	8	14
Oligochaeta (Lumbricidae)	0	0	0	0	+	+
Oligochaeta (Enchytraeidae)	+	0	0	0	+	+
Total Number of Species For Each Site						
	23	2	16	78	62	111

out of 16 nests and in 31/47 of the samples. This species was recorded in samples throughout the year, from April to October. Adults (including gravid females) and juveniles were found in the nests and were often very numerous, i.e. more than 20 individuals in a 2 litre sample. The common pygmy woodlouse *Trichoniscus pusillus* Brandt was also numerous in some nests and in one case an aggregation of the woodlouse *Haplophthalmus mengii* (Zaddach) s.s. was observed containing more than 30 individuals. *Platyarthrus hoffmannseggii* Brandt, the myrmecophilous woodlouse, was found less widely, recorded at only one site.

Both adult and juvenile myriapods were common in the nest mounds, with at least nine species of millipede and seven of centipede recorded (Appendix). Three species of spider were recorded, including the myrmecophile *Thyreosthenius biovatus* (Cambridge) which was recorded at two sites. Three pseudoscorpion individuals were observed, all from the same nest, across two samples. One of these escaped before identification was possible; the others were *Pselaphochernes scorpioides* (Hermann).

Forty-four species of mite were recorded in the nest material, including four myrmecophilous species: *Androlaelaps casalis* (Berlese), *Hypoaspis montana* (Berlese), *Hypoaspis neocuneifer* Evans & Till (present in over a third of samples) and *Hypoaspis oophila* (Wasmann). No mites were found physically attached to the ants. Worms (earthworms and enchytraeid worms) were found in some nests. These were not identified to species.

Site variation

Sites differed in the number and range of nest associates found (Table 2 and Appendix). The five sites included in the survey are similar geologically, but vary in their vegetation and the size of *F. rufa* population. Comparisons of nest associate diversity between sites have limited power, due to the variation in number of nests and samples included. One site-level result which is nonetheless clear is the limited occurrence of the myrmecophilous woodlouse, *P. hoffmannseggii*. This species was found at only one of the sites (Eaves Wood). Here, it was found in three of the four nests sampled and was numerous with juveniles as well as adults present. This woodlouse was not found at any of the other four sites although a total of 41 samples were taken at those sites, suggesting this is a genuine absence, not a lack of detection. Within sites, nests were also variable in their species composition (see Appendix).

Seasonal data

The periods of highest nest associate species diversity were in April and August with fewer species recorded in early summer and in autumn (Fig. 1). Examination of the taxon-specific data shows that the two periods of high diversity were accounted for by different groups. In April, myriapods (Diplopoda and Chilopoda) were by far the most species-rich group present, making up $40\% \pm 2\%$ (meanSE) of species recorded. In contrast in August, the Isopoda ($27\% \pm 2\%$) and Coleoptera ($27\% \pm 7\%$) were the most species rich groups, with myriapods less diverse ($21\% \pm 4\%$).

Effectiveness of sampling strategy

Species accumulation curves show the total number of species found, over the multiple samples made (Fig. 2). The graphs show that by the end of the study, the discovery of new species was beginning to level off, although it was still rising. Further effort would be expected to yield more species, though at a diminishing rate. Extrapolating these fitted curves give projected totals of species living in *F. rufa* nests at these sites as 33 (excluding mites and springtails) and 121 (including mites and springtails). This suggests that the sampling performed in 2007–2008 recorded 87% of the large invertebrates that could be recorded with this method and the sampling in 2009 recorded 77% of all invertebrates that could be recorded with this method, (including mites and springtails). However, these estimates should be treated with caution, as extrapolations of this kind have very large margins of error unless the dataset is at least 90% complete (Bebber *et al.*, 2007). In addition, this analysis treats

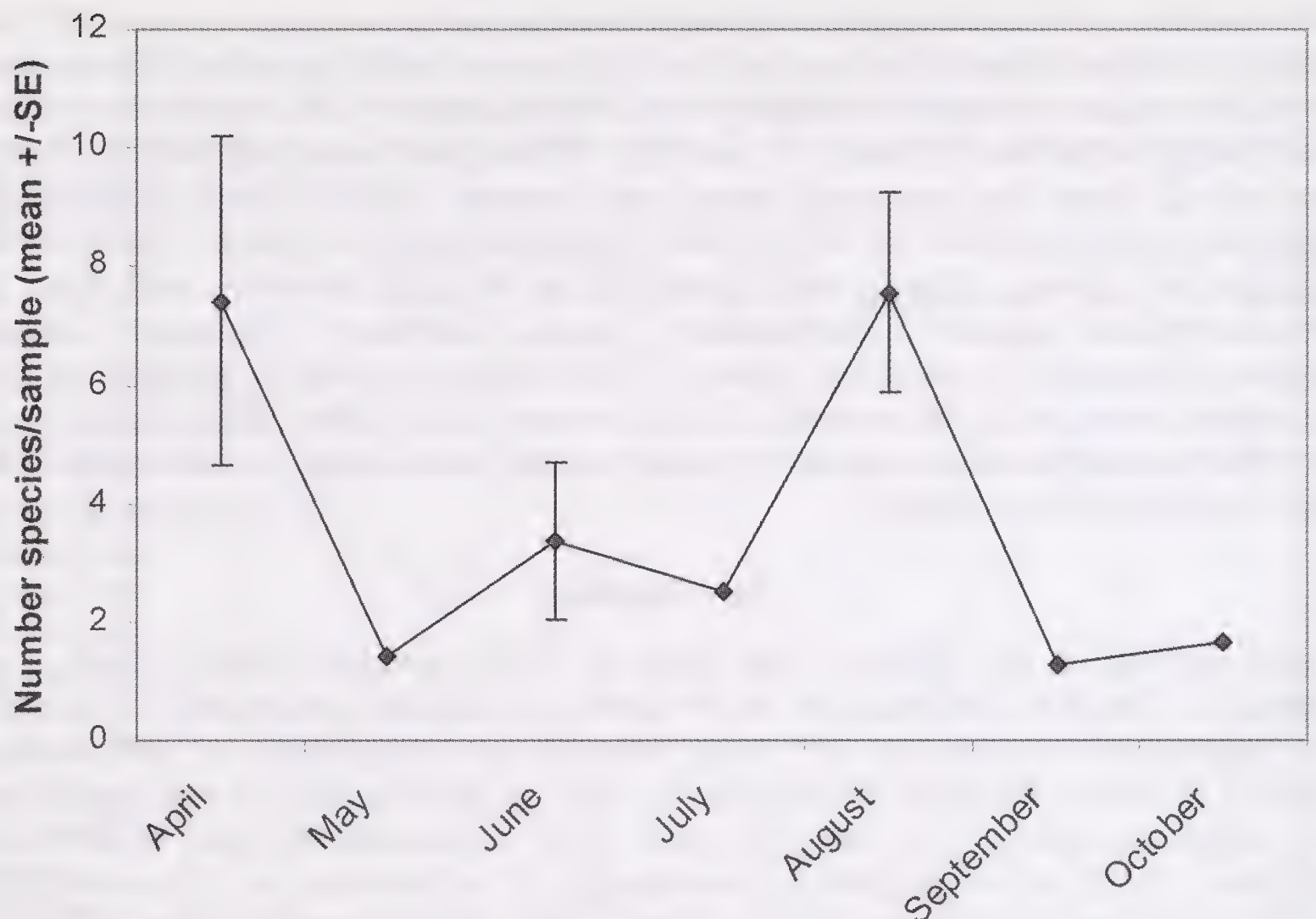


Figure 1. Seasonal change in species diversity of nest associates. Data presented as number of species recorded in each month, divided by the number of samples taken in that month, averaged over the sampling years. For August, number of years: $n = 3$; for April and June, $n = 2$; for May, July, September and October $n = 1$ year.

all the samples as equal and there may also be effects of nest and site which are not taken into account here. Taking the only nest which was visited enough times to be amenable to this sort of analysis (Gaitbarrows Nest 13, visited ten times in 2007–2008) and applying the same methods to this single nest, similar results are found (Fig. 2c), suggesting that of the large invertebrates that could be recorded with this method and were present in that particular nest, 85% been found over the course of the survey.

DISCUSSION

This extensive survey clearly shows that even a relatively isolated population of *F. rufa* at the northern limit of its range harbours a rich fauna of myrmecophiles and nest associates. Some of these associates appear to have a loose association with *F. rufa*, probably taking advantage of the nest conditions. Others are more likely to be accidental associates that have fallen or strayed onto the ant nest. The natural history and myrmecophile/associate status of the invertebrates found is discussed below for each taxon.

Hymenoptera

Formicoxenus nitidulus, the Shining guest ant, nests within the thatch of its wood ant hosts, in Britain primarily *F. rufa* and *F. lugubris*. It is thought to scavenge within the wood ant nests and uses a strategy of generalised chemical deterrence to repel its hosts (Martin, Jenner & Drijfhout, 2007). *Formicoxenus nitidulus* is a British Action

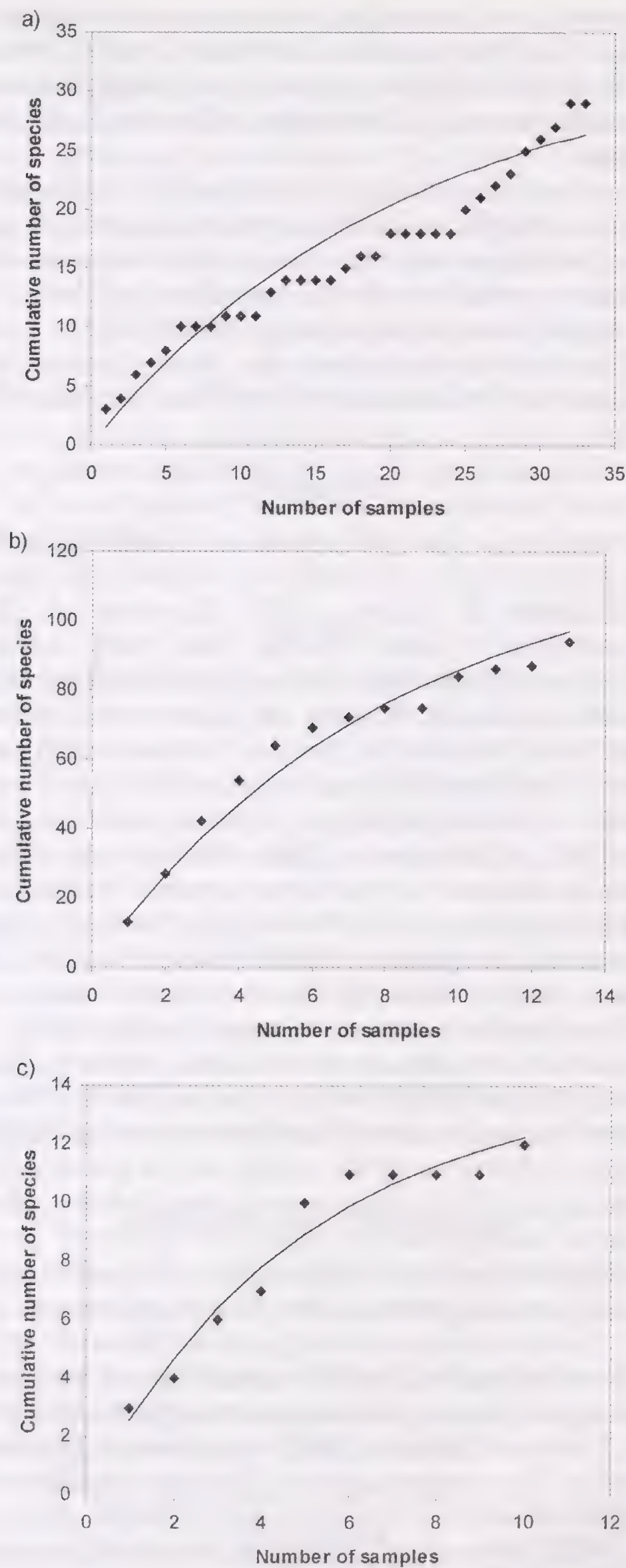


Figure 2. Species accumulation curves showing increase in number of species discovered over repeated samples and fitted curves of the form $y=e^b-e^{-ax+b}$. (a) Data for 2007–2008, excluding mites and springtails (see methods). Parameters: $b=3.51$, $a=0.047$, $R^2=0.88$. (b) Data for 2009, including mites and springtails. Parameters: $b=4.80$, $a=0.123$, $R^2=0.71$. (c) Data for Gaitbarrows Nest 13 only, 2007–2008, excluding mites and springtails. Parameters: $b=2.65$, $a=0.2$, $R^2=0.81$.

Plan species. In this study it was found at only one site, although it has been recorded in the past at several of the sites sampled (Robinson, 2005b). The absence of records for some sites in this study is likely to be due to the sampling time of year, with this species being most easily detected in the autumn while most sampling was carried out in spring and summer.

The megaspilid wasp *Conostigmus formiceti* is a known myrmecophile. Donisthorpe (1927) (referring to it as *Conostigmus wasmanni*) suggests it is confined to wood ant nests, but notes that the nature of its association with the ants is unknown. An additional wasp record was supplied by Murdo Macdonald (*pers. comm.*) from a *F. lugubris* nest at Carrbridge (NH918215): *Trichopria longicornis* Wasmann male. This diapriid wasp has also been recorded from *F. rufa* and *F. lugubris* nests in the past by Donisthorpe (1927 and British Museum specimens).

Coleoptera

The staphylinids were by far the most abundant, numerous and widespread group of beetles recorded in this survey. Globally, staphylinids are diverse and prevalent myrmecophiles (Hölldobler & Wilson, 1990; Kronauer & Pierce, 2011). The myrmecophilous staphylinids found during this study (*Atheta talpa* (Heer), *Gyrophypnus atratus* (Heer), *Leptacinus formicetorum* Märkel, *Lyprocorrhe anceps* (Erichson), *Oxypoda formiceticola* Märkel, *O. haemorrhoea* (Mannerheim), *Thiasophila angulata* (Erichson), *Notothecta flavipes* (Gravenhorst) and *Quedius brevis* Erichson) have been found previously in the nests of *F. rufa* and other wood ant species and are thought to be dependent on the wood ants for at least part of the life cycle (Donisthorpe, 1927; Collingwood, 1965; Päävinen, Ahlroth & Kaitala, 2002; Päävinen *et al.*, 2004). Additional records were supplied by Murdo Macdonald from *F. lugubris* nests: Longart Forest (NH396646), 2 × *Notothecta flavipes*; Carrbridge (NH908215) and south of Carrbridge (NH90792148) *Oxypoda haemorrhoea*. Two of these myrmecophilous staphylinids, *Q. brevis* and *G. atratus*, are described by Donisthorpe (1927) as ‘hostile persecuted lodgers’ and prey on the host ants and brood. They avoid attack by staying on the nest periphery, hiding in holes and moving rapidly (Donisthorpe, 1927; Staniec & Zagaja, 2008). The other seven species listed above are tolerated by the ants (‘indifferently treated lodgers’, Donisthorpe, 1927), probably due to acquisition of the colony odour (as seen in other staphylinid species (Rettenmeyer *et al.*, 2011)) and in some cases aided by their very small size. The presence of larval staphylinids in the nests surveyed in the current study indicates that some species may breed in the nests – although these predatory larvae are very mobile, so it is also possible that they have moved into the nest after hatching.

Two other species of staphylinid were recorded in ant nests during this survey. *Atheta (Datomicra) nigra* (Kraatz) has been recorded in *F. rufa* nests in Denmark in the past (Päävinen, Ahlroth & Kaitala, 2002), but is also found away from ant nests and does not appear to be a myrmecophile. *Geostiba circellaris* (Gravenhorst) has been recorded in association with *Formica fusca*, *Lasius* spp. and *Myrmica* spp. (Staniec & Zagaja, 2008) but does not appear to have been observed with wood ants before. In this study it was recorded at two sites and in one case two specimens were present in the nest sample. However, *G. circellaris* is a forest floor species, so may have simply been accidentally present in the nest thatch as it moved through its habitat.

The other myrmecophilous beetles recorded in this study (*Ptilium myrmecophilum* Allibert, *Monotoma conicollis* Aubé and *Monotoma angusticollis* Gyllenhal) have also

been recorded previously from *F. rufa* and other wood ant nests (Donisthorpe, 1927; Päivinen, Ahlroth & Kaitala, 2002; Päivinen *et al.*, 2004). They scavenge in the nests and appear to avoid attention from the ants due to their small size (Donisthorpe, 1927). The scydmaenid *Cephennum gallicum* Ganglbauer has not been recorded in association with ants before and is represented by a single record here, suggesting it was most likely accidentally present. The ptiliid *Acrotrichis intermedia* (Gillmeister) has been recorded with *F. rufa* in the past (Päivinen, Ahlroth & Kaitala 2002), but is a common forest floor species and again, only one was found in the course of this study, so is likely to be an accidental associate. Although the ptiliid *Acrotrichis montadonii* (Allibert) is not strictly myrmecophilous (Johnson, 1990), it has been recorded in the nests of *F. rufa* and several other *Formica* and *Lasius* species (Donisthorpe, 1927; Johnson, 1990; Päivinen, Ahlroth & Kaitala, 2002) and in this study was recorded in six nests across three sites, suggesting that this species may have some level of genuine association with ants. An additional record of a scaptiid beetle, an *Anaspis* sp. was supplied by Murdo Macdonald from a *F. lugubris* nest: North of Carrbridge (NH886241).

Diptera

The sciarid fly *Lycoriella subterranea* (Märkel) has been recorded previously from *F. rufa* nests, including from one of the sites of this survey (Märkel, 1844; Menzel, Smith & Chandler, 2006; Smith & Menzel, 2007). Märkel (1844) considered this species to be a true myrmecophile, describing it as ‘inseparable’ from wood ants and found it commonly in nests in large numbers. However, this species has more recently been found in other habitats such as heath (Menzel & Mohrig, 2000), so its status as a myrmecophile remains questionable. *Bradysia placida* (Winnertz) is a common species that does not appear to have any particular association with ants (Smith & Menzel, 2007). The related sciarid *Bradysia chandleri* Menzel was first described from specimens found in association with *F. rufa* nests on Gaitbarrows (Smith & Menzel, 2007), but was not recorded during this survey. Donisthorpe (1927) recorded several sciarids in *F. rufa* nests, but was not able either to identify them to species, or to observe any clear relationship with their hosts. Donisthorpe (1927) and Märkel (1844) also record flies from several other families in *F. rufa* nests.

Lepidoptera and Thysanoptera

There are several species of Lepidoptera which spend all or part of the larval stage in ant nests, either scavenging in the nests, or being actively cared for by the ants (Donisthorpe, 1927). However, the single lepidopteran larva in this study did not resemble any of these species and had most likely dropped onto the nest surface from an overhanging tree. The *Thrips minutissimus* L. found is a species associated with oaks and had most likely blown onto the nest surface.

Collembola

Cyphoderus albinus is described by Donisthorpe (1927) as “panmyrmecophilous”, being found with all investigated ant species in Europe. More recently, it has been recorded as living with the invasive species *Lasius neglectus* Van Loon (Dekoninck, Lock & Janssens, 2007). Lubbock (1929) described maintaining a population of “may I say thousands” in formicaria with *F. rufa*. This springtail is blind and how it moves from host to host is unknown, although chemical orientation is likely.

The other species of Collembola recorded in the nests are not known to have any association with ants and, with the exception of the relatively scarce *Lathriopyga longiseta* (Caroli), are common in leaf-litter and/or in tree canopies. *Lepidocyrtus cyaneus* was very numerous in some ant nest samples and was found in more samples than *C. albinus*. *Entomobrya nivalis* (L.), *Folsomia quadrioculata* (Tullberg) *Isotoma viridis* (Bourlet), *L. cyaneus* and *Pseudosinella alba* (Packard) have all been found in ant nests (*Formica* sp.) in Finland, but also occur in many other habitats (Huhta *et al.*, 2010). It is probable that most of these other Collembola are accidentally present, having strayed into the nest or dropped from the canopy.

Isopoda

Platyarthrus hoffmannseggii, the blind white woodlouse, had a very patchy distribution within the extended *F. rufa* population studied. This species is an obligate myrmecophile and in addition to *F. rufa*, utilises a wide range of hosts both in its native European range (Lubbock, 1929; Harding & Sutton, 1985) and in America where it is introduced (Brooks, 1942). It has also been found in nests of the invasive Asian species *L. neglectus* in Belgium (Dekoninck, Lock & Janssens, 2007). These woodlice eat soil, dead wood and the frass of their hosts (Williams & Franks, 1988) and are usually tolerated by their hosts without aggression. Moving individuals into a different colony increases both ant investigative behaviour and evasive and defensive (e.g. clamping down) behaviours by the woodlice, suggesting that they usually avoid the attention of their hosts by acquiring the colony odour (Williams & Franks, 1988).

The other species of woodlice found in the nest samples are common in woodland leaf-litter and are likely to be commensals taking advantage of the compost heap-like properties of the wood ant nests. The presence of gravid females and very small juveniles of both *P. scaber* and *T. pusillus* suggests that these species can breed in *F. rufa* nests. *Porcellio scaber* was found in most of the nests, but has no obvious adaptations to protect it from the wood ants, in contrast with the flattened and behaviourally specialised *P. hoffmannseggii*. How these woodlice avoid detection is not clear, but they may acquire the colony odour and become effectively invisible to their hosts, or may be chemically difficult to detect (Witte *et al.*, 2008).

Myriapods

Donisthorpe (1927) mentions only three species of millipedes (*Blaniulus guttulatus* (F.), *Proteroiulus fuscus* (Am Stein) and *Polyxenus lagurus* (L.)) as having any association with ants in Britain and he does not consider them to be actual myrmecophiles. The only one of these found in the course of this study was *P. fuscus*, both adults and juveniles. Of the centipede species found, *Lithobius forficatus* (L.) has been recorded with *F. rufa* and *Formica pratensis* before and both *Lithobius microps* Meinert and *Schendyla nemorensis* (Koch) with *F. pratensis*, but no myrmecophilous relationship has been observed (Stoev & Lapeva-Gjonova, 2005). These myriapods are probably opportunistic associates, taking advantage of the warm compost-heap-like nature of the nests.

Aranae and Pseudoscorpionida

The myrmecophilous *Thyreosthenius biovatus* breeds within ant nests of the *F. rufa* group (Donisthorpe, 1927). Donisthorpe considers it to be very common, stating

'I have personally found both sexes of *T. biovatus* in every *Formica rufa* nest I have examined, from the Highlands to the South Coast of England and in every month of the year.' There are very few records of this species away from ants. The other two species of spider found (*Enoplognatha ovata* (Clerck) and *Paidiscura pallens* (Blackwall)) are common species with no particular ant-association, although *E. ovata* will prey on ants (Cushing, 2012). The pseudoscorpion *Pselaphochernes scorioides* was recorded in *F. rufa* nests by Donisthorpe (1927) as *Chelifer scorioides*. He comments that if one was grasped by an ant, it was dropped straight away, suggesting that they are able to repel their hosts. A survey of pseudoscorpions in east Germany found that 21% of records of this species (total 330) were from ant nests, including *F. rufa* (Droglá & Lippold, 2004), so it is clearly a common associate, although apparently not a true myrmecophile.

Acari

Mites are diverse and widespread myrmecophiles (Hölldobler & Wilson, 1990; Kronauer & Pierce, 2011). Donisthorpe (1927) discusses 39 species of myrmecophilous mite in Britain which either attach themselves to the body of ants or live entirely in ant nests and it is likely that there are many more. The life habits of the four myrmecophilous mite species found in this study differ widely.

Androlaelaps casalis is a predator. It was previously considered to have a myrmecophilous subspecies, *A. casalis myrmecophila* (Evans & Till), but this has recently been raised to species level (Huhta & Karg, 2010). Both *A. casalis* and *A. myrmecophila* have been previously recorded in ant nests (*Formica* sp.) (Huhta *et al.*, 2010). *Hypoaspis montana*, *H. oophila* and *H. neocuneifer* were all found in ant nests, including those of *F. rufa*, by Donisthorpe (listed as *Laelaps* (*Oolaelaps*) *montanus* Berlese, *Laelaps* (*Oolaelaps*) *oophilus* Wasmann and *Laelaps* (*Cosmolaelaps*) *cuneifer* Mich – see Evans and Till (1966)). *Hypoaspis montana* has been recorded as living exclusively in ant nests in Finland (Huhta *et al.*, 2010). *Hypoaspis oophila* lives among the egg piles of the ants, feeding on the salivary excretions of the workers when they lick the eggs Donisthorpe (1927). *Hypoaspis neocuneifer* scavenges and feeds on dead ants (Donisthorpe 1927). In this study it was recorded at three sites and in eight samples, sometimes in large numbers. It has also been recorded in ant nests (*Formica* sp.) in Finland (Huhta *et al.*, 2010).

The other species of mites found in this study are common woodland species, probably accidentally present or taking advantage of the ant nest conditions. *Damaeus clavipes* (Hermann), *Nothrus palustris* (Koch), *Platynothrus peltifer* (Koch), *Punctoribates punctum* (Koch), *Rhysotritia ardua* (Koch), *Vegeia nemorensis* (Koch), *Vegaia cerva* (Kramer), *Vulgarogamasus kraepelini* (Berlese) and *Xenillus tegeocranus* (Hermann) have all been found in ant nests (*Formica* sp.) in Finland, but also occur in many other habitats (Huhta *et al.*, 2010). *Trichouropoda spatulifer* is commonly found in both ant nests and other woodland habitats (Karg, 1989; Winiewski & Hirschmann, 1993).

Oligochaeta

Earthworms and enchytraeid worms were found in some nests. These might have simply been coincidentally present in the soil but wood ant nests can be hotspots for certain species of earthworms. Our samples were from the upper thatch, so the rarity of earthworm records in our study is probably not a reflection of their occurrence in the lower soil mound. In one study, *Dendrodrilus rubidus* Savigny were numerous in

Formica aquilonia nest mounds, while the surrounding soil contained mostly *Dendrobaena octaedra* Savigny (Laakso & Setälä, 1997). The *D. rubidus* worms seemed to produce a repellent mucous which protected them from attack by the ants in laboratory tests (Laakso & Setälä, 1997), an adaptation also seen in other species of earthworm (Gaume *et al.*, 2006). The enchytraeid fauna of wood ant nests is usually poor relative to the surrounding soil and other habitats (Laakso & Setälä, 1998; Huhta *et al.*, 2010). Laakso and Setälä (1998) suggest that this is due to predation pressure from the ants, rather than because nest conditions are unsuitable. They showed that enchytraeid worms thrived in ant nest material from which ants and other predators were excluded.

Seasonal trends

The data show variations throughout the season of ant activity in the level of diversity and composition of the nest associate fauna observed in the samples. However, it should be noted that all samples were taken from the upper part of the thatch and it is possible that some groups move up or down through the nest during the year in response to temperature and humidity changes. For example, *Formicoxenus nitidulus* males are found on the surface of wood ant nest mounds on sunny days from August to October (Busch, 2001; Robinson, 2005b), making the species easiest to detect at this time of year. For a full investigation of seasonal patterns of ant nest use, samples should be taken from different levels of the thatch, soil base and underground chambers throughout the year and combined with measurements of microclimate.

Sampling strategies

The species accumulation curves suggest that the number of sampling replicates used gave reasonable (70-80%) coverage of the invertebrates that could be expected to be found using this method. Other methods, e.g. Tullgren funnels, would provide a more thorough survey of smaller invertebrates such as mites than the visual search used in this study (F. D. Monson, National Museums Liverpool, *pers. comm.*). Another fruitful approach would be to compare the invertebrate fauna of nest samples with samples of soil and leaf-litter from adjacent areas. This would provide an indication of whether the large numbers of non-myrmecophilous mites, springtails, woodlice and myriapods which were found in the nests are simply present due to their predominance in the surrounding habitat, or whether some are concentrated in the ant nests, indicating that they benefit from some property of the nests. A paired comparison of this sort was performed for *F. aquilonia* nests in Finland (Laakso & Setälä, 1998). In their study, two of the species recorded in ant nests in this study, the springtail *Folsomia quadrioculata* and the mite *Veigaia nemorensis*, were recorded in much higher densities in the nests than in the surrounding soil: *F. quadrioculata* comprised 10% of animal biomass in nest material versus 0.6% in the soil; *V. nemorensis* 18% versus 0.5% in the soil (Laakso & Setälä, 1998). What causes this preference for the ant nest environment is not known. Laakso and Setälä (1998) performed a general analysis of the detrital food webs of *F. aquilonia* nest mounds and the surrounding soil and found clear differences. The nest mounds were dominated by bacterial-feeding microfauna, contrasting with the fungal-feeding microfauna which dominated surrounding soil samples. Laakso and Setälä (1998) suggest that these differences could be caused by the relatively constant

temperature and moisture in ant nests, the energy input by the ants to the nests and the exclusion by the ants of many other predator species.

The nests used in this study were mature well established nests with thatch of diameter minimum 1m (with the exception of nest B on Arnside Knott, which decreased in size during the study). Myrmecophilous beetles are both more abundant and more species rich in larger wood ant nests (Päivinen *et al.*, 2003; Päivinen *et al.*, 2004). More generally, diversity of myrmecophiles is likely to be positively correlated with ant colony size (Kronauer & Pierce, 2011). In addition, the myrmecophilous beetle fauna in *F. aquilonia* nests that are close to other nests is richer than in more isolated ones (Päivinen *et al.*, 2004). The nest sizes and nearest neighbour distances were not recorded in our study. These factors might account for some of the between-nest variation and are areas for future study.

Conservation implications

Wood ants in Britain, especially in the north of England, persist primarily in ancient woodland fragments (Satchell & Collingwood, 1955; Robinson, 2001). The current data demonstrate that even a relatively isolated population of *F. rufa* at the northern limit of its British range harbours a rich invertebrate fauna. However the data also suggest that the presence of myrmecophiles can be quite aggregated, even within a host population. Several of the commoner myrmecophiles were found at only one of the sites studied and not in all nests at these sites. For obligate myrmecophiles, this high level of habitat fragmentation (both the fragmentation of their host populations, and their own uneven distribution within the host population) is likely to put them at risk of extinction. Fragmentation limits the ability of species to move within an ecological network, making them vulnerable to habitat disturbance and climate change (Thomas *et al.*, 2004). Isolated populations can also become highly inbred, which can lead to population collapse (Frankham & Ralls, 1998). It is unknown how most myrmecophiles, including blind species such as *Platyarthrus hoffmannseggii* and *Cyphoderus albinus*, find new host nests. *Platyarthrus hoffmannseggii* is attracted to formic acid (Brooks, 1942), but is also found in the nests of non-formicine ants which would not be detectable by this method. Generalist myrmecophiles, such as *P. hoffmannseggii* with at least 30 host ant species from at least seven genera (Lubbock, 1929; Brooks, 1942; Harding & Sutton, 1985; Dekoninck, Lock & Janssens, 2007) and the ‘panmyrmecophilous’ *C. albinus* (Donisthorpe, 1927) may use nests of other species as stepping-stones across patches of habitat unsuitable for some of its hosts. *Formicoxenus nitidulus* is largely confined to the mound-building *Formica* spp. (Boer *et al.*, 1995; Martin, Jenner & Drijfhout, 2007), but mated females have the option of flight and the guest ant has been seen on the trails between wood ant nests formed in the process of budding (Busch, 2001; Robinson, 2005b), giving them two routes for spreading through the population.

Formica rufa is classed as ‘near threatened’ by the IUCN (2008). By extension this means that all the species dependent on it are also at risk. More work on their myrmecophiles is required to determine the nature of their relationship with their hosts in more detail, to discover their methods of dispersal and to assess the extent to which existing populations are genetically isolated and vulnerable.

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ANNOUNCEMENT

Ento'13

This year the Royal Entomological Society will be holding its International Symposium and National Meeting at the University of St Andrews, 4–6th September. The theme for the symposium is ‘Thirty years of Thornhill & Alcock: The evolution of Insect Mating systems’. Symposium speakers will include Professor Roger Butlin (Sheffield), Professor Nina Wedell (Exeter), Professor Leigh Simmons (University of Western Australia), Professor Göran Arnquist (Uppsala) and Professor Boris Baer (University of Western Australia). Session themes for the national meeting organised by Graham Stone (Edinburgh) and David Shuker (St Andrews) include Pollinator Behaviour, Ecology and Evolution; Beneficial insects, Insect community ecology and Insect Genomics.

Further information, registration, abstract and accommodation booking forms are available on www.royensoc.co.uk

Appendix. Details of species records. * indicates that the species has been described in the literature as a myrmecophile. Prevalence is calculated as percentage of samples in which species was present. Total number of samples = 23 for Acari and Collembola; 47 for all other taxa. Sites at which recorded: AK = Arnside Knott, CP = Coldwell Parrock, EW = Eaves Wood, GB = Gaitbarrows, GW = Grubbins Wood. List of nests (see Table 1) and number of samples per nest in which the species was recorded: provided to show un/evenness of distribution within and between sites. Months in which the species was recorded and number of samples in that month in which it was recorded (4(× 2) = two samples in April, etc). Number of individuals per sample: + indicates that the species was present, but numbers are not known; + + indicates that the species was present and numerous, but exact numbers not known. Notes: a = adult, f = female, j = juvenile, m = male, q = queen, w = worker.

	Prevalence (%)	Nest IDs at which recorded (× no. samples per nest in which recorded)					Months in which recorded	Number per sample	Notes
		AK	CP	EW	GB	GW			
Hymenoptera									
Formicidae									
<i>Formicoxenus nitidulus</i> (Nylander)*	29.8				13(×9), 47(×3), 163(×2)		4(×3), 5, 7, 8(×3), 9(×4), 10(×2)	4–23	Mostly m; some w & q
Megaspilidae									
<i>Conostignus formiceti</i> (Erichson)*	4.3				13, 163		4, 8	1	Det. “probable”
Coleoptera									
Monotomidae									
<i>Monotoma conicollis</i> Aubé*	2.1					7	6	1	a
<i>Monotoma angusticollis</i> Gyllenhal*	2.1					7	6	1	a
Ptiliidae									
<i>Acrotrichis intermedia</i> (Gillmeister)	2.1	A					9	1	m
<i>Acrotrichis montadonii</i> (Allibert)	19.1			1	13, 104a(×2)	6a(×3), 7, 17	4, 5, 6(×3), 8(×4)	1–15	a
<i>Ptilium myrmecophilum</i> Allibert*	2.1				13		4	3	a
Scydmaenidae									
<i>Cephennium gallicum</i> Ganglbauer	2.1				13		8	1	a
Staphylinidae									
<i>Atheta talpa</i> (Heer)*	6.4				104A, 163	7	4(×2), 8	1–6	a
<i>Atheta nigra</i> (Kraatz)	2.1				13		4	1	a
<i>Geostiba circellaris</i> (Gravenhorst)	4.3	A			163		4(×2)	1–2	a
<i>Gyrophypnus atratus</i> (Heer)*	6.4				13		4(×2), 8	1–4	a
<i>Leptacinus formicetorum</i> Märkel*	19.1	A	3		13(×3), 104a, 163	6a, 17	5, 6(×2), 7, 8(×2) 9(×2), 10	1–5	a
Lyprocorrhe anceps (Erichson)*									
<i>Notothecta flavipes</i> (Gravenhorst)*	17.0				23, 104a, 163	7	4(×2)	1	a
						6a, 7(×2), 17(×2)	4(×2), 5, 7(×2), 8(×3)	1–8	a

continued

	Prevalence (%)	Nest IDs at which recorded (× no. samples per nest in which recorded)				Months in which recorded	Number per sample	Notes
		AK	CP	EW	GB	GW		
<i>Oxypoda formiceticola</i> Märkel*	2.1				104a		1	a
<i>Oxypoda haemorrhoea</i> (Mannerheim)*	2.1					17	1	a
<i>Quedius brevis</i> Erichson*	2.1				163		1	a
<i>Thiasophila angulata</i> (Erichson)*	10.6	B			104a, 163	7, 17	1-7	a
Larval Staphylininae, genus indet.	4.3				13, 104a		1-2	j
Larval Aleocharinae, genus indet.	2.1				104a		7	j
Larval subfamily indet.	14.9			4	13, 47, 104a(×2)	7, 17	1:++	j
Diptera								
Sciaridae								
<i>Bradysia placida</i> (Winnertz)	4.3	A				7	1	m & f
<i>Lycoriella subterranea</i> (Märkel)*	2.1					7	1	m
sp. indet.	2.1					17	2	f
Lepidoptera								
sp. indet.	2.1					7	1	larva
Thysanoptera								
<i>Thrips minutissimus</i> L.	2.1					7	1	m
Collembola								
Entomobryomorpha								
<i>Cyphoderus albinus</i> (Nicolet)*	26.1				13, 47, 163, 104A(×2)	17	2-12	
<i>Entomobrya multifasciata</i> (Tullberg)	4.3				13		1	
<i>Entomobrya nivalis</i> (L.)	4.3				163		1	
<i>Folsomia quadrioculata</i> (Tullberg)	4.3				163		1	
<i>Isotoma</i> sp. <i>viridis</i> (Bourlet) group	4.3	A					2	
<i>Lepidocyrtus cyaneus</i> Tullberg	43.5				13(×3), 104A(×2), 163(×2)	17(×2), 7	1-18	
<i>Lepidocyrtus lanuginosus</i> (Gmelin)	4.3				163		1	immature
<i>Orchesella cincta</i> (L.)	4.3				13		1	
<i>Pseudosinella alba</i> (Packard)	13.0				13(×2), 47		1-3	
<i>Tomocerus vulgaris</i> (Tullberg)	4.3					17	1	immature

continued

Appendix (continued)

	Prevalence (%)	Nest IDs at which recorded (× no. samples per nest in which recorded)				Months in which recorded	Number per sample	Notes
		AK	CP	EW	GB			
Poduromorpha								
<i>Deuteraphorura cebennaria</i> (Tullberg)	4.3					7	4	1 Det. “probable”
<i>Lathriopyga longiseta</i> (Caroli)	8.7				104a	7	8(×2)	1
Isopoda								
<i>Armadillidium vulgare</i> (Latreille)	4.3	A, B					9(×2)	1-2 a & j
<i>Haplophthalmus danicus</i> Budde-Lund	4.3			4		7	6, 9	1,3
<i>Haplophthalmus mingei</i> (Zaddach) s.s.	6.4				13	17(×2)	4, 8(×2)	1:++
<i>Haplophthalmus mingei</i> (Zaddach) s.l.	4.3					7(×2)	4, 8	1,1 could be <i>H. montivagus</i> Verhoeff
<i>Platyarthrus hoffmannseggi</i> Brandt*	6.4			1, 3, 4			6, 7, 9	1-14
<i>Porcellio scaber</i> Latreille	66.0	A(×2), B	3	3(×2)	13(×7), 47(×4), 104A(×2), 163(×2), 23	3, 7(×4), 6a, 17(×3)	4(×7), 5(×2), 6(×2), 7(×3), 8(×6), 9(×8), 10(×3)	1-26 a & j; gravid f
<i>Trichoniscus pusillus</i> Brandt s. l.	23.4	A(×2), B		2, 3	47	6a, 7(×3), 17	4(×2), 9(×6), 8(×3)	1-51 a & j; gravid f
<i>Trichoniscus pygmaeus</i> Sars	2.1					7	8	1
Diplopoda								
<i>Archiboreoiulus pallidus</i> Brade-Birks	2.1				47		4	1
<i>Brachydesmus superus</i> (Latzel)	4.3				13(×2)		4, 8	1-2 a
<i>Choneiulus palmatus</i> Nemec	2.1			4			6	1
<i>Cylindroiulus britannicus</i> Verhoeff	4.3		3		47		10(×2)	1 could be <i>C. latestriatus</i> Curtis
<i>Cylindroiulus punctatus</i> Leach	36.2	A(×2)		2, 3, 4	13(×4), 47(×2), 163	7(×4), 17	4(×5), 5, 6, 8(×3), 9(×6), 10	1-10 a & j; 1 juv det. “probable”
<i>Glomeris marginata</i> Villers	2.1				13		5	1
<i>Julus scandinavius</i> Latzel	2.1				13		4	1
<i>Ophiulus pilosus</i> Newport	2.1					7	4	1
<i>Proteroiulus fuscus</i> (Am Stein)	12.8			3, 4	13(×3)	7	4, 5, 7, 9(×3)	1-4 a, j
<i>Polydesmus</i> sp.	8.5				13	3, 7(×2)	4(×2), 9(×2)	1:++ j
<i>Polydesmida</i> , genus indet.	4.3				13, 104a		4, 8	5:++ j

continued

Appendix (continued)

	Prevalence (%)	Nest IDs at which recorded (× no. samples per nest in which recorded)				Months in which recorded	Number per sample	Notes
		AK	CP	EW	GB			
Chilopoda								
<i>Cryptops hortensis</i> Leach	4.3				13, 47		1-2	
<i>Geophilus flavus</i> (De Geer)	4.3				13, 47		1	
<i>Geophilus</i> sp.	8.5	A		3	13	7	1:-++	a & j
<i>Lithobius forficatus</i> (L.)	10.6				13, 47	3,7, 17	1-2	a; j det “probable”
<i>Lithobius microps</i> Meinert	2.1				104a		4	a; j det “probable”
<i>Lithobius variegatus</i> Leach	2.1	A					1	
<i>Lithobius</i> sp.	8.5	A, B			104a	7	1(×4)	j
<i>Schendyla nemorensis</i> (Koch)	4.3	A			13		1,2	
<i>Stigmatogaster subterranea</i> (Shaw)	2.1	A					1	
Aranae								
<i>Enoplognatha ovata</i> (Clerck)	2.1			3			1	j
<i>Thyreosthenius biovatus</i> (Cambridge)*	4.3				47	17	1,2	m
<i>Paidiscura pallens</i> (Blackwall)	2.1					7	1	
Indet.	8.5				13(×2), 47	7	1-2	a (escaped); j; j,m possibly <i>Ceratinella</i> <i>brevipes</i> (Westring)
Pseudoscorpionida								
<i>Pselaphochoernes scorpioides</i> (Hermann)	2.1			3			2	a
Indet.	2.1					7	1	a (escaped)
Acari								
Astigmata								
<i>Astigmata</i> , genus indet.	4.3				13		2	f

continued

	Prevalence (%)	Nest IDs at which recorded				Months in which recorded	Number per sample	Notes
		AK	CP	EW	GB			
Ixodidae								
Ixodidae, genus indet	4.3				13		1	j
Mesostigmata								
<i>Androlaelaps casalis</i> (Berlese) s.l.*	13.0			4	13, 47(×2)		1-15	f
<i>Cosmolaelaps claviger</i> (Berlese)	17.4			4	47, 163	17	1-2	f
<i>Hypoaspis montana</i> (Berlese)*	13.0			4	47(×2)		2-6	f & m
<i>Hypoaspis neocuneifer</i> Evans & Till*	34.8	A			13(×2), 104a, 163	7(×2), 17	1-6	f
<i>Hypoaspis oophila</i> (Wasmann)*	4.3			4			1	f
<i>Hypoaspis</i> sp.	4.3				13		1	m
<i>Macrocheles submotus</i> Falconer	8.7	A(×2)					1(×2)	f
<i>Onchodellus furcifer</i> Oudemans	4.3				163		3	f
<i>Pachylaelaps</i> sp.	4.3					7	10	f & m
<i>Paragamasus</i> (<i>Paragamasus</i>) sp.	26.1				13, 104a, 163	7(×2), 17	4, 3, 2, 7, 2, 9	f,,m &,j
<i>Pergamasus alpestris</i> (Berlese)	4.3					17	1	m
<i>Pergamasus crassipes</i> (L.)	4.3					7	10	f & m
<i>Pergamasus longicornis</i> (Berlese)	13.0				13	7(×2)	1,2,2	f & m
<i>Pergamasus quisquiliarum</i> (Canestrini)	4.3			4			1	f
<i>Pergamasus septentrionalis</i> Oudemans	4.3	A					2	f
<i>Pergamasus</i> (<i>Paragamasus</i>) sp.	17.4	A				6a, 17, 7	1(×3),2	f & m
<i>Pergamasus</i> (<i>Pergamasus</i>) sp.	4.3					6a	2	m
<i>Proprioseiopsis</i> sp.	4.3					47	1	f, det. “prob-able”
<i>Trichouropoda spatulifer</i> Moniez	21.7				13, 47, 104a, 163	7	1-7	m,f & deutonymphs
<i>Trichouropoda</i> sp.	4.3						1	deutonymph
<i>Veigaia cerva</i> (Kramer)	8.7					6a	1-3	f
<i>Veigaia nemorensis</i> (Koch)	17.4	A			47, 163	7(×2)	1-8	f
<i>Veigaia planicola</i> (Berlese)	4.3				13	17	1	f
<i>Veigaia</i> sp.	4.3				163		2	m (1 det. “probable”)
<i>Vulgarogamasus kraepelini</i> (Berlese)	4.3					7	1	m
<i>Vulgarogamasus remberti</i> (Oudemans)	4.3					7	1	f

continued

Appendix (continued)

	Prevalence (%)	Nest IDs at which recorded (× no. samples per nest in which recorded)				Months in which recorded	Number per sample	Notes
		AK	CP	EW	GB			
Oribatida								
<i>Adoristes poppei</i> (Oudemans)	4.3				104a		8	1
<i>Damaeus clavipes</i> (Hermann)	4.3				104a		8	1
<i>Damaeus onustus</i> Koch	39.1	A, B			47, 104a(×2), 163	7, 17(×2)	4(×2), 6, 8(×4), 9(×2)	4, 1(×2), 2, 2, 1, 3, 5, 5
<i>Eupelops plicatus</i> (Koch)	4.3				104a		8	1
<i>Euzetes nitens</i> (Johnston)	17.4				47(×2)	7(×2)	4, 6, 8, 9	1, 1, 1, 6
<i>Hermannia gibba</i> (Koch)	13.0				47, 104a	7	4, 8(×2)	1, 2, 2
<i>Hermanniella granulata</i> (Nicolet)	8.7				104a	7	8(×2)	1, 8
<i>Nothrus palustris</i> (Koch)	4.3				13		4	2
<i>Phthiracarus</i> sp.	8.7				163	7	4, 8	1-2
<i>Platynothrus peltifer</i> (Koch)	4.3				104a		8	1
<i>Punctoribates punctum</i> (Koch)	4.3					7	8	1
<i>Rhysotritia ardua</i> (Koch)	4.3				163		4	6
<i>Steganacarus magnus</i> (Nicolet)	13.0				104a, 163	7	4, 8(×2)	1
<i>Xenillus tegeocranus</i> (Hermann)	13.0				47, 163	6a	4(×2), 8	1-3
Prostigmata								
Cunaxidae, sp. A (colour: blue)	8.7				47	17	6, 8	2
Cunaxidae, sp. B (colour: drab)	4.3				47		6	1
Oligochaeta								
Lumbricidae								
Lumbricidae, genus indet.	4.3					7, 17	4, 8	+
Enchytraeidae								
<i>Fridericia</i> sp.	2.1					17	8	+
Enchytraeidae, genus indet.	8.5	A				7(×2), 17	4, 8, 9(×2)	+

SHORT COMMUNICATION

Exotic scale insects (Hemiptera: Coccoidea) causing severe damage to ornamental pittosporum in London. – During the summer of 2011, Japanese pittosporum *Pittosporum tobira* (Thunb.) W.T.Aiton (Pittosporaceae) hedges in the Squirrel Monkey Exhibit, Zoological Society of London, London Zoo (ZSL), Regent's Park, London, England (51.533N, 0.152W), exhibited severe leaf loss, dieback and thinning (Plate 6, Fig. 1), with some individual plants being almost killed. Sven Seiffert, Team Leader Horticulture of the Zoological Society of London, collected a sample from the infested plants on the 21 July 2011 and passed it to Mike Robinson of the Plant Health and Seeds Inspectorate during an inspection at London Zoo. The sample was forwarded to The Food and Environment Research Agency (FERA) laboratory where it was found to be heavily infested with cottony cushion scale *Icerya purchasi* Maskell (Hemiptera: Monoplebiidae), the infestation consisting of dozens of adults (Plate 6, Fig. 2), and thousands of nymphs (Plate 6, Fig. 3).

Also present were old ovisacs, and hundreds of nymphs (Plate 6, Fig. 4) of camellia scale *Pulvinaria floccifera* (Westwood) (Hemiptera: Coccidae). The upper surface of some of the foliage was covered in honeydew excreted by the scale insects, which served as a medium for the growth of black sooty moulds. *Icerya purchasi* is native to Australia and *Pulvinaria floccifera* to East Asia.

A third exotic insect, pittosporum sucker *Trioza vitreoradiata* (Maskell) (Hemiptera: Triozidae), native to New Zealand, was also present in small numbers, causing pit galls to the foliage. Four species of predatory insect were also observed: *Anthocoris* sp. (Hemiptera: Miridae); Vedalia ladybird *Rodolia cardinalis* (Mulsant) (Coleoptera: Coccinellidae); unidentified midge larvae (Diptera: Cecidomyiidae); and unidentified lacewing larvae (Neuroptera: Chrysopidae). Vedalia ladybird is an exotic introduction from Australia that is used commercially as a biological control agent against *I. purchasi* (Salisbury & Booth, 2004). Also present on the foliage were large numbers of mites (Prostigmata: Tydeidae) and bark lice (Psocoptera: Ectopsocidae) feeding on the sooty moulds.

This is the first report of *I. purchasi* and *P. floccifera* causing serious damage to ornamental pittosporum in Britain, and the first occasion that *I. purchasi*, *P. floccifera* and *T. vitreoradiata* have been found feeding on the same plants. *Icerya purchasi* was the dominant species. Throughout much of 2012, the infestations of scales and psyllids were so bad that the most seriously affected plants were removed, and the ZSL are now considering replanting the hedge with a more mixed scheme (S. Seiffert, *pers. comm.*, 2013). The scales and psyllids survived very wide ranges in abiotic conditions during 2012. For example, the temperature and relative humidity (RH) measured with an Onset Computer Corporation Hobo Pro v2 data logger by the Horticultural Department during 2012 varied from -6.5°C in November to 42.6°C in July, and 14.3% RH in March to 100% RH during every month of the year.

Icerya purchasi has naturalised in south east England since 1994 on plants belonging to at least 36 genera assigned to 25 families (Watson & Malumphy, 2004). In Britain, it is most commonly recorded on *Acacia*, *Albizzia* and *Citrus*. *Pulvinaria floccifera* has naturalised throughout Britain since the 1870s, and has increased its host plant range and abundance in England and Scotland during recent decades (Malumphy & Badmin, 2007). In Britain, it is most serious as a pest of camellia, holly and rhododendron (Malumphy, 2009). *Trioza vitreoradiata* has naturalised in southern England and west Scotland since 1993, and feeds exclusively on *Pittosporum* spp. (Martin & Malumphy, 1995; Salisbury, Halstead & Malumphy, 2011). The plant *P. tobira* is native to China, Korea and Japan, but is used

throughout the world as an ornamental plant in landscaping, and for cut foliage. *Pulvinaria floccifera* may originate from the same region as *Pittosporum tobira*, but *I. purchasi* and *T. vitreoradiata* clearly do not.

Seven more exotic species of scale insect have been recorded feeding on ornamental *Pittosporum* in Britain (FERA and the Royal Horticultural Society (RHS) unpublished records), but none of these have been reported having a serious impact: *Aspidiotus nerii* Bouché (Diaspididae); *Coccus hesperidum* L. (Coccidae); *Parthenolecanium persicae* (F.) (Coccidae); *Pseudococcus calceolariae* (Maskell) (Pseudococcidae); *Pseudococcus longispinus* (Targioni Tozzetti); *Pseudococcus viburni* (Signoret); and *Saissetia oleae* (Olivier) (Coccidae). These species are usually found on indoor plantings but may occur outdoors in sheltered situations.

There have been relatively few published reports of exotic scale insects causing severe damage to ornamental plants growing in Britain. *Icerya purchasi* and *P. floccifera* are among those introduced species that have the greatest economic and aesthetic impact on ornamental plants grown in urban areas in Britain. The negative impact of both these species appears to be increasing, based on samples received by FERA.

Thanks are due to Sven Seiffert of the Zoological Society of London for information on the infestation, and temperature and RH data, and to Andy Salisbury and Andrew Halstead of the Royal Horticultural Society for access to their entomological archive. – CHRIS MALUMPHY, The Food and Environment Research Agency, Sand Hutton, York, YO41 1LZ, UK.

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HABITAT PREFERENCE AND DISTRIBUTION OF *RHACOGNATHUS PUNCTATUS* (HEMIPTERA: PENTATOMIDAE) IN WALES

ALEX J. RAMSAY

44 Sun Lane, Burley-in-Wharfedale, Ilkley, West Yorkshire LS29 7JB

Email: alexramsay6@yahoo.com

ABSTRACT

A summary of the distribution and habitat preferences for *Rhacognathus punctatus* (L.) in Wales is provided. *Rhacognathus punctatus* has been recorded from nine sites in Wales and is strongly associated with mires and coastal dune wetlands, with two records from coastal and riverine heathland.

INTRODUCTION

The predatory shieldbugs (Pentatomidae: Asopinae) comprise a small group of shieldbugs within Britain, with the largest of the five species recorded in Britain, *Jalla dumosa* (L.) now considered extinct, having previously been known only from Kent (Kirby, 1992). The remaining four species have all been recorded from Wales (Howe, 2004), of which *Rhacognathus punctatus* (L.) (Plate 7, Fig. 1) has been recorded only comparatively recently in Wales (Askew, 1990), in contrast to the other three species, which had all been recorded by 1930.

Picromerus bidens (L.) was first recorded in Wales from Bridgend in Glamorgan (Blomer, 1833). This record was overlooked by Douglas & Scott (1865), who give very few localities for any of the Asopinae, and no records from Wales. Saunders (1892) gives only one Welsh locality, Swansea, for *Zicrona caerulea* (L.), apparently the first record for Wales. Butler (1923) cites early records of *Troilus luridus* (F.) from Merionethshire and Pembrokeshire.

Records for *R. punctatus* in Wales were not published until 1990 (Askew, 1990), despite specimens dating back to the 1950s, and it was not documented from Wales by Southwood & Leston (1959). *Rhacognathus punctatus* is undoubtedly an extremely cryptic and under-recorded species but would appear to be widespread throughout Wales (Fig. 1) and with high habitat fidelity. There has been no previous attempt to clarify the distribution and habitat preferences of *R. punctatus* in Wales.

Rhacognathus punctatus exclusively predaes leaf beetles (Chrysomelidae) (Péricart, 2010). Both adults and larvae of a number of species of leaf beetle are predated including the heather beetle *Lochmaea suturalis* (Thomson), and a range of *Salix*-feeding species including *Lochmaea caprea* (L.) (Southwood & Leston, 1959), *Phratora vulgatissima* (L.), *Galerucella lineola* (F.) (Cox, 2007) and *Plagioderma versicolora* (Laicharting) (Péricart, 2010). *Rhacognathus punctatus* has also been recorded predaing *Phaedon cochleariae* (F.) larvae on crucifers and *Hydrothassa marginella* (L.) on *Ranunculus* spp. (Cox, 2007). The distribution of *R. punctatus* is likely to be closely linked to habitats which provide an abundance of suitable prey.

DISTRIBUTION OF *R. PUNCTATUS* IN WALES

Rhacognathus punctatus was first recorded in Wales from Fenn's Moss (SJ489369) on 12 May 1951 (National Museum of Wales (NMW)), though this capture was unknown to Southwood & Leston (1959) who stated 'not yet reported from Wales,

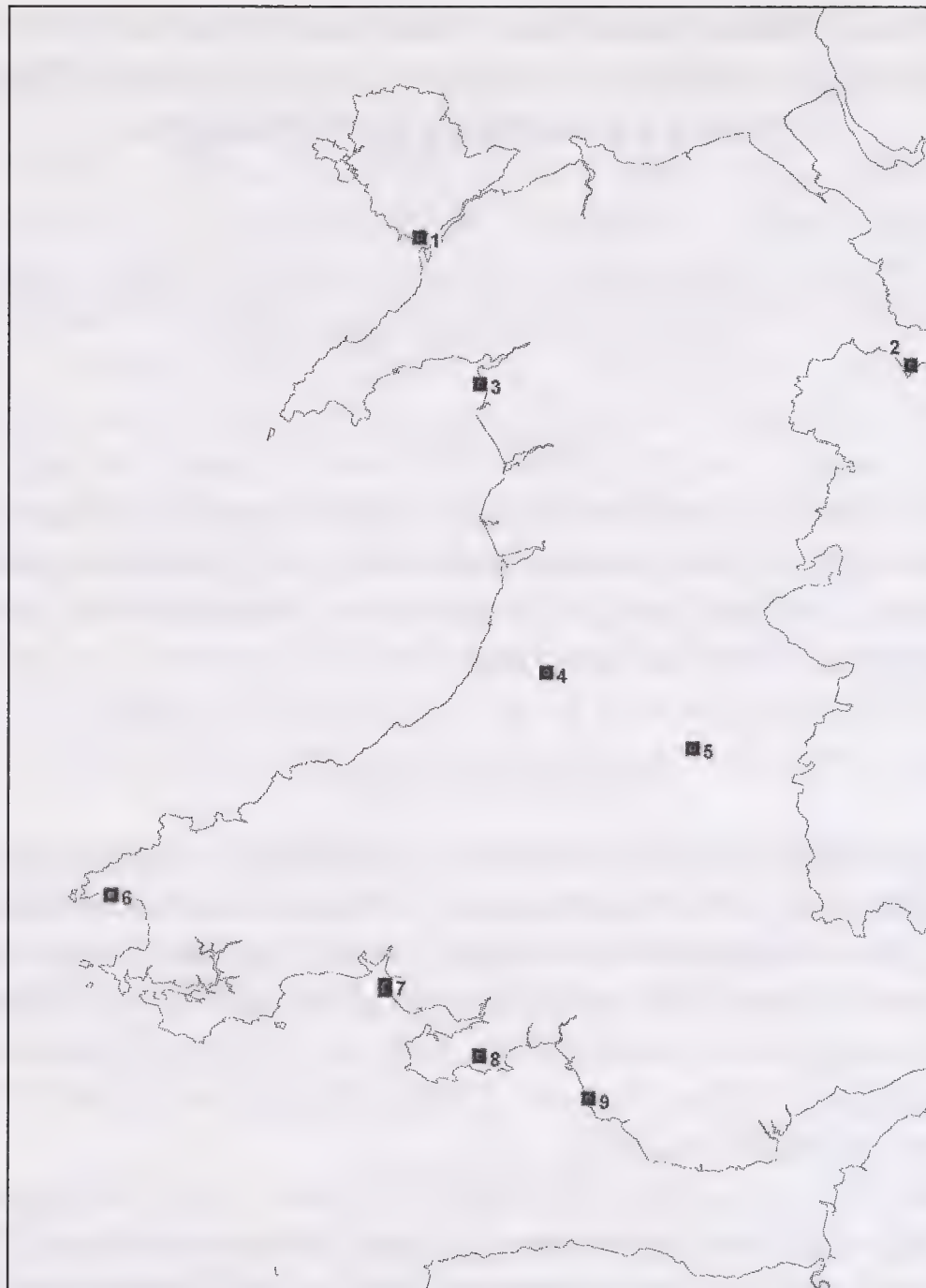


Figure 1. Recorded distribution of *Rhacognathus punctatus* in Wales.

Site numbers: 1 = Newborough Warren, 2 = Fenn's Moss, 3 = Morfa Harlech, 4 = Afon Ystwyth, Tynbedw, 5 = Cors y Llyn, 6 = Porth y Rhaw, 7 = Tywyn Burrows, 8 = Fairwood Common, 9 = Kenfig Burrows.

but certainly present there'. It was subsequently re-recorded at Fenn's Moss on 3rd August 1988 (SJ4783) during the Welsh Peatland Invertebrate Survey (Holmes, Boyce & Reed, 1995) and again in 2003, indicating a long continuity of the species in the Fenn's Moss lowland raised mire complex. During May 1968, *R. punctatus* was recorded for the second time in Wales by Richard Loxton, this time from Newborough Warren (SH46), Anglesey, and is the most northerly site in Wales for this species. *Rhacognathus punctatus* has been sporadically recorded at Newborough Warren between 1972 and 1996.

It was not until 1988 that two new sites for *R. punctatus* were discovered in Wales, with records from Glamorgan at Fairwood Common, Gower peninsula, Glamorgan (SS568905), where five specimens were taken on 26 September 1988 (Askew, 1990), and this was the first time that Welsh records of *R. punctatus* were recorded in the literature. *Rhacognathus punctatus* was also found in Pembrokeshire for the first time at Porth y Rhaw (SM786242) on 6 April 1988 by Mike Howe.

In 1989 a further two Welsh sites were recorded for *R. punctatus*; Tywyn Burrows (SN3605), in Carmarthenshire, when a specimen was recorded by Roger Key on 15 April, and Cors y Llyn NNR (SO017554), Radnorshire, where a further specimen was detected by the Welsh Peatland Invertebrate Survey on 19 June (Holmes, Boyce

& Reed, 1991). *Rhacognathus punctatus* was recorded again at Tywyn Burrows by Mike Howe on 20 May 2005, the most recent record of *R. punctatus* in Wales.

Three additional sites are known for *R. punctatus* in Wales. A single specimen was found by Roger Morris at Morfa Harlech dunes (SH5632) on 27 April 1991, the first record from Gwynedd. A further specimen of *R. punctatus* was obtained by suction vacuuming of a mature dune slack dominated by *Salix repens* on 12 July 1994 at Kenfig Burrows NNR, Glamorgan, South Wales (SS794815) by the author, and is the second site in Glamorgan known for this species. Mike Howe recorded the species new to Cardiganshire at Afon Ystwyth, Tynbedw (SN700718) on 23 July 1999, the first record in Wales from riverine dry heathland, which itself is a rare habitat in Wales (Fowles, 1994).

DISCUSSION

All records in Wales are from high quality wetland habitats usually partly or entirely designated as NNRs (Fowles, 1994) suggesting that wetland habitats with a long continuity may be profitable places to look for new colonies of *R. punctatus*. In the south of England *R. punctatus* also occurs on dry heaths (Hawkins, 2003), but this habitat appears to be the least utilised by this species in Wales, as *R. punctatus* has been recorded at only two heathland sites Porth-y-Rhaw in Pembrokeshire, a coastal heathland site, and Afon Ystwyth, Tynbedw, Cardiganshire, a dry heath derived from river shingle.

Current evidence indicates that *R. punctatus* occurs predominantly in wetland biotopes in Wales, particularly lowland raised mires (Cors y Llyn, Fairwood Common, Fenn's Moss) and mature coastal dune slacks with *Salix* cover (Kenfig, Morfa Harlech, Newborough, Tywyn), which provide suitable habitats for its chrysomelid beetle prey. Wetlands appear to be the main habitat of this elusive species in Wales, and it is apparently restricted to habitats with a long continuity. The most recent records of *R. punctatus* have been obtained from both mires and dune slacks, but even where it is known to occur it can be extremely evasive – despite its continued presence in Fenn's Moss, it has been found there on very few occasions in over a 40 year period since its discovery, and a similar pattern is noted for Newborough Warren.

Whilst *R. punctatus* is regarded in conservation circles as local or common, any site at which *R. punctatus* is recorded in Wales is indicative of long habitat continuity, and the presence of this species as part of a larger wetland assemblage is likely to be of high conservation importance, as has been demonstrated for *R. punctatus* many of the sites where it occurs are already designated as nationally important.

ACKNOWLEDGEMENTS

The author thanks Mike Howe, Countryside Council for Wales, for providing data on previous records of *R. punctatus* in Wales and additional references; to Peter Kirby for drawing my attention to further Welsh records for this species; to Mike Wilson, National Museum & Galleries of Wales, Cardiff, for examining the holdings of *R. punctatus* and extracting data from specimens; to Bernard Nau for checking Welsh records submitted to the Heteroptera Recording Scheme; and to Tristan Bantock for providing a photograph of *R. punctatus* and for checking for additional records in the Shieldbugs and Allies Terrestrial Heteroptera Recording Scheme. Thanks to Tim Donoyou for the map. Thanks to two anonymous referees who commented on an earlier draft of this paper.

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SHORT COMMUNICATIONS

***Erotettix* (= *Macrosteles*) *cyane* (Boheman) (Hemiptera: Cicadellidae) in Berkshire (VC22).** – On 23 June 2011, I visited a pond at Barrow farm Fen (SU4697) VC22 (modern Oxfordshire). A shallow pond on clay created approximately a decade before, had a deeper section dominated by extensive rafts of broad-leaved pondweed *Potamogeton natans*. Upon this I found a few adult *Erotettix cyane* (Plate 7, Fig. 2). A second visit was made on 20 September when over a hundred late instar nymphs and 50 plus adults were seen. Many of the adults still had the powdery sky-blue bloom and appeared very fresh. This is the most northerly site for the species in England and the first records for VC22. It will be interesting to discover whether this site forms part of the natural distribution of this species, which is highly scattered in southern England (and the more likely explanation) or whether it represents a possible northward extension of range. The few observations we have of this species to date suggest that it is not a particularly active disperser, with local populations on individual ponds dying out rather than expanding and re-establishing themselves. In common with the Surrey site at Newdigate, the pondweed rafts were also home to large numbers of the local pondweed bug *Mesovelia furcata* (Mulsant & Rey) (Hem.: Mesoveliidae). – JONTY DENTON, 31 Thorn Lane, Four Marks, Hants GU34 5BX.

***Legnotus limbosus* (Geoffroy) (Hemiptera: Cydnidae) in my garden.** – On 1 May 2007, I was sitting on the back steps of my house in Oxford (grid reference SP510068), basking in the warm sunshine, when I noticed a small, black shieldbug scurrying across the brick yard at my feet. I took the insect as a specimen, a female, and identified it as *Legnotus limbosus* (Geoffroy) (Plate 7, Fig. 3), a local species only occasionally encountered in the field. I did not think very much of this at the time, nor when on 20 May I witnessed several more of the bug do the same (a female and three males), as I thought that the insects had presumably flown in the previous year and hibernated. The gravelly area under the decking at the rear of my house, from which they appeared to be dispersing, seemed a reasonable place in which to spend the winter. However, this was not the last I was to see of this species at my home.

In 2011, I decided to set up some pitfall traps in my back garden, curious as to what such a central Oxford location might harbour. The garden is 19 metres long by 5.5 metres wide, walled on all sides with a solid wooden gate at the bottom. It is somewhat unkempt, with a weedy area forming the bottom half, containing the garden shed, behind which is a heap of garden refuse. Two traps were set in the weedy area, in front of the shed, and ran continuously from 18 March to 15 October. In the period 29 March to 20 June they took ten specimens of *L. limbosus*, nine males and one female. The number of specimens encountered, in both 2007 and 2011, was surprising given the occasional nature of my captures sweeping in the field. Furthermore, the only other Heteroptera captured in the garden pitfall traps, throughout 2011, were two specimens of *Scolopostethus affinis* (Schilling) and one of *Drymus sylvaticus* (F.), both common groundbugs (Lygaeidae). Hence, the number of shieldbugs captured in 2011 was several times more than all the other Heteroptera added together, and it was clearly the most prevalent bug crawling around my garden.

The trapping was repeated in 2012, with five more traps added: three in the weedy area in front of the shed, one behind the shed by the compost heap, and the last beside the brick yard where I had observed the species in 2007. These ran continuously between 16 March to 20 October, and in the period 17 May to 30 May took 21 specimens of *L. limbosus* (15 males and six females), with a further two females taken between 30 May and 4 July. Of these 23 shieldbugs, six were found in the single trap beside the brick yard, and the remainder were taken in the five traps in the weedy area in front of the shed. Throughout 2012, the captures of bugs included only five specimens of *S. affinis* and two of *D. sylvaticus*, emphasising again the prevalence of the shieldbug in relation to the other Heteroptera crawling in my garden. Two other bugs were also taken during the year, single specimens of *Sehirus luctuosus* Mulsant & Rey (Cydnidae) and *Eremocoris podagricus* (F.) (Lygaeidae). The former is a shieldbug associated with forget-me-not, *Myosotis* spp. (Boraginaceae), which is common in the weedy area of the garden. The latter is a seldom encountered groundbug, which will be the subject of a separate publication.

An obvious conclusion from the foregoing is that I have a breeding colony of *L. limbosus* in my garden. However, I have yet to find any nymphs of this species, either in the traps, by sweeping or by searching plant roots. The host plant of this species is bedstraw, *Galium* spp. (Rubiaceae) (Southwood & Leston, 1959), and what little there is of it in my garden grows along the back wall. Neither these plants, nor the pitfall trap placed deliberately near them in 2012, have yielded any *L. limbosus*, adult or nymph. However, other plant associations have been reported for this species, specifically three members of the Lamiaceae – *Ballota nigra* L. (Allen, 1958), *Glechoma hederacea* L. (as *Nepeta hederacea* (L.) Trevir.) and *Lamium purpureum* L. (Thomas, 1954) – so an alternate plant may host the bug in my garden, and a more comprehensive search may discover the missing juveniles. However, it is also possible

that the trap captures are individuals that have dispersed from a breeding site elsewhere, seeking but failing to found a new breeding colony in my garden. It seems clear, from the absence of late summer and autumn trap captures, that this dispersal occurs in the spring, once the bugs have emerged from hibernation, and not, as I originally assumed, in the previous year when the new generation first appears. My captures in the field, by sweeping, show a similar temporal distribution, limited to the earlier part of the season: seven in the spring and one on 14th July. Kirby (1991) reports an occasion when the insect was found in large numbers in the spring, sweeping a woodland ride, with some seen in flight.

The male to female ratio of my garden captures (27:11) looks rather biased towards males. Using the Binomial Distribution, the cumulative probability of 11 or fewer females in a random sample of 38 adults, from a population containing equal numbers of males and females, is just 0.69% (<http://stattrek.com/online-calculator/binomial.aspx>, accessed 29 January 2013), strongly suggesting that my trap captures are indeed biased towards males, and that the unequal sex ratio has not arisen by chance. (The sex ratio in my swept field captures is more equal (3:5), but there are too few data here to draw reliable conclusions.) If there was an equal male-to-female ratio in the adults developing from nymphs, I might expect a slight bias towards the females in the trap captures, if they outlive the males in order to develop and lay eggs. However, the female of this species is reported to burrow into the soil in order to lay eggs, and remain there on guard until they hatch (Thomas, 1954), so this behaviour, or a greater mobility in general on the part of the male, may account for the observed bias in trap captures, rather than there being an unequal sex ratio among hatching adults. Whatever the explanation for the observed sex ratio, the large number of males trapped in the spring suggests that this is when mating takes place, as there would be little point in the males hibernating if this had already occurred in the previous year. The observed spring dispersal is presumably part of the mating behaviour of this species.

My garden captures of *L. limbosus* are not the first urban records for this species (e.g. Woodroffe, 1953; Hawkins, 1994; and Heldon & Leather, 2005), and I have taken the animal myself on wasteground in Oxford (Iffley Fields, SP523047, 2 June 2006). However, in a search of the last 60 years of the British entomological literature, I found no mention of garden captures, which is an astonishing omission. Putting pitfall traps in the garden is such an obvious thing for an entomologist to do, and the shieldbugs are difficult to miss and easy to identify. Urban records for this species are important because if the bug proves to be widespread among our towns and cities, as it probably is, the national status of the insect may have to be reviewed. Given that urban areas are slightly warmer than the surrounding countryside, the species may occur further north than is currently believed. The published records are all south of a line (roughly) from the Wash to the Severn estuary (Nau, 2005), with a single record from Sherwood Forest, Nottinghamshire (Scudder, 1957). Consequently, several new county records for the insect may await entomologists through the simple expedient of putting pitfall traps in their garden.

Some excellent images of *L. limbosus* can be found on the British Bugs website (<http://www.britishbugs.org.uk>). – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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PLATE 5. Fig. 1: *Formica rufa* nest mounds. (a) Nest 104, Gaitbarrows. (b) Nest 18, Grubbins Wood: scale provided by 1m long walking stick. Photos: N. A. Robinson.



PLATE 6. Fig. 1: *Pittosporum tobira* hedge at London Zoo showing thinning and dieback. ©Mike Robinson. Fig. 2: *Icerya purchasi* hermaphrodite adults. ©FERA. Fig. 3: *Icerya purchasi* nymphs. ©FERA. Fig. 4: *Pulvinaria floccifera* nymphs. ©FERA.



PLATE 7. Fig. 1: *Rhacognathus punctatus*. Photo: Tristan Bantock. Fig. 2: *Erotettix cyane*, Berkshire 2011. Photo: Jonty Denton. Fig. 3: *Legnotus limbosus*, Photo: Tristan Bantock. Fig. 4: *Meconema meridionale*, Hartley Woods, Kent, 2012. Photo: Pauline Heathcote.

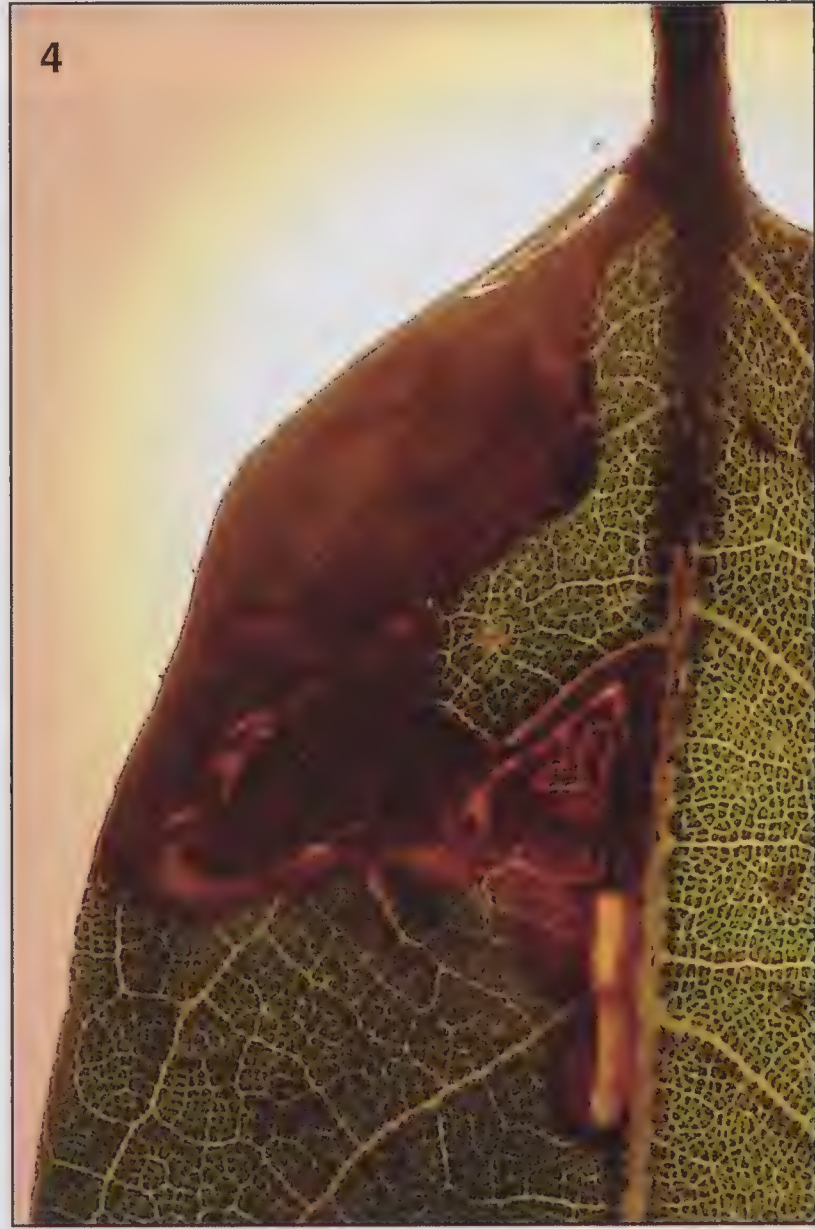


PLATE 8. Fig. 1: Adult female *Margattea nimbata* ssp. *nimbata*, Pershore, September 2008. Fig. 2: *Margattea nimbata* cf. *nimbata* nymph, orchid house, Hampshire, October 2007. © FERA. Fig. 3: *Hypena obsitalis* on a wall at Gilkicker Fort, Hampshire, 2012. Photo: Jonty Denton. Fig. 4: Typical leafmine of *Phyllonorycter messaniella* on cork oak. Photo: D. Hubble.

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Further records of the Southern oak bush-cricket *Meconema meridionale* Costa (Orthoptera: Tettigoniidae) from Kent. – On 6.ix.2005 I found a male *Meconema meridionale* (Plate 7, Fig. 4) in my garden at Gravesend, Kent TQ6773 (Jennings, 2005). This appears to have been the first record for Kent of this recently introduced species (Hawkins, 2001). I have not attempted to search for this species but I have the following casual records from the same locality; 29.xi.2009 one male in garden, 8.viii.2010 one male in garden shed, 15.ix.2010 one female in garden, 29.xi.2010 one dead female on pavement below trees (after a very cold night), 29.ix.2011 one female in garden, 6.x.2012 one male in house (attracted to light?). Clearly *M. meridionale* is well established locally.

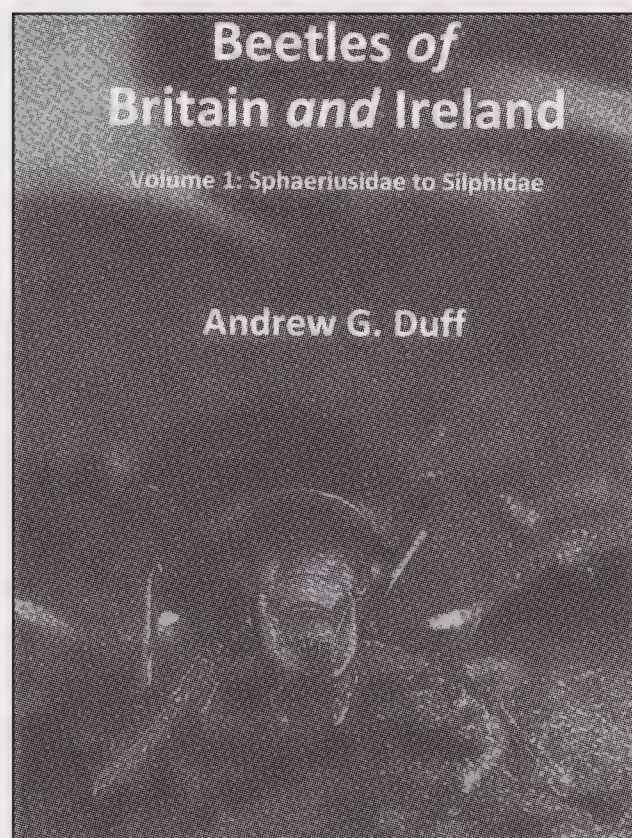
In the past I have also recorded from the house or garden the Oak bush-cricket *Meconema thalassinum* (De Geer), although it is likely that I have been less diligent in noting all of the records. *Meconema thalassinum* was recorded on 12.viii.1993, 1.viii.1994, 30.vii.1995, 20.vii.1996, 17.xi.1998, 18.ix.2004. These too are all casual records. Interestingly I have not observed this species since the last date and I now wish that I had the voucher specimen or a photograph of the 2004 sighting. Although the interactions and relationship between a native species and an introduced similar species are very difficult to unravel, my observations do suggest that locally *M. meridionale* may have replaced *M. thalassinum*.

Meconema meridionale has been recorded elsewhere in North Kent. A female was found on a washing line in a suburban garden in Northfleet TQ6372 on 6.x.2012 (Irene Robson) and a male was found and photographed in an area of mature oak and hornbeam trees at Hartley Woods TQ616677 on 1.xii.2012 (Peter and Pauline Heathcote). Richard Moyse has also provided me with the following records from elsewhere in Kent; August 2006 Thamesmead TQ48Q (Yvonne Sharp), 3.x.2007 Canterbury TR162561 (Laurence Clemons), and 23.x.2011 near Ashford TR009440 (Dan Bennett).

I am grateful to all those mentioned above for providing me with their records. – M. T. JENNINGS, 206 Lower Higham Road, Kent, DA12 2NN.

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BOOK REVIEW

Beetles of Britain and Ireland Volume 1 Sphaeriidae to Silphidae

by Andrew G. Duff. Published by A. G. Duff (Publishing), West Runton, Norfolk 2012. Hard cover, 496pp, 250 × 170mm. Price £89.00. ISBN 978-0-9573347-0-0.

This is the first of a planned 4 volume series enabling the accurate identification of all the adult beetle species recorded in Great Britain and Ireland. It covers the first 18 families of the most recent checklist which include the Carabidae, most of the aquatic families, Histeridae, Ptiliidae, Leiodidae, etc. When complete the series will be the first comprehensive British identification source since Norman H. Joy's 2-volume 'Practical

Handbook' published in 1932. In the intervening 80 years there have been numerous species additions, family revisions and nomenclatural changes and the need for such a work is long overdue.

An impressive 36 pages are devoted to a detailed illustrated explanation of external morphology and glossary of terms used. A general key to all families which will ultimately be covered in the series is followed by the main text of volume 1, nearly 500 pages, which provides dichotomous keys to 887 species, copiously illustrated. There is a brief introduction to each family, with helpful notes to every species keyed. I am relieved to note that English 'pseudo-names' have not been used throughout.

With the exception of an important 40-page monograph of the Ptiliidae (Featherwing Beetles) by Michael Darby, no great claim is made to originality and reliance has been placed upon the extraction of information from published keys, including from non-British sources; the bibliography extends to nearly 300 references in this volume alone.

Finally, there are 47 colour plates by Udo Schmidt showing 241 habitus photographs of representative species. At 4 to 6 species on each page, the illustrations are of a decent size, each with a scale bar showing the actual size; however, their quality is disappointing. Unfortunately, the lighting source used reflects strongly on the high gloss surfaces of many species which I find visually very distracting. Also, good luck to anyone intending to use 'picture-matching' – interpreting the colours of some species is likely to be difficult. Hopefully these faults will be corrected in successive volumes. Such illustrations are perhaps of limited value to the experienced coleopterist and these shortcomings should not detract from the series becoming a standard reference for many years to come. I only wish such a work had been available when I first decided to transfer my energies from the microlepidoptera to beetles, some 30 years ago, and I look forward to the completion of the remaining 3 volumes, hopefully within my lifetime!

NORMAN HEAL

MARGATTEA NIMBATA (DICTYOPTERA: BLATTELLIDAE) BREEDING IN BRITISH ORCHID HOUSES

PAUL F. WHITEHEAD

Moor Leys, Little Comberton, Pershore, Worcestershire WR10 3EH

ABSTRACT

Cockroaches breeding in an orchid glass house near Pershore, Worcestershire, during 2008 have been identified as *Margattea nimbata* ssp. *nimbata* (Shelford). The ecology and distribution of the species and its subspecies are discussed and passing reference is made to other invertebrates and developing ecological relationships in the glasshouse and to a further transient population in Hampshire. The Pershore population of *M. nimbata* ssp. *nimbata* is now extinct.

INTRODUCTION

Until recently, an orchid nursery in the Pershore area of Worcestershire (VC37 SO94) grew Moth Orchids (*Phalaenopsis* cultivars based on *P. amabilis* (L.) Blume) in a computer-controlled environment under glass. The owners were concerned about some insect colonists and superficial damage to some of the plants and the nursery was first visited on 4 September 2008. For reasons of plant hygiene and the existence of an automated overhead irrigation system no extended study was made at the site although on that date an equally unfamiliar salticid spider was found. The cockroaches had first been observed earlier in 2008 and had increased rapidly so that numbers were being caught on 15 yellow sticky traps placed in the crop. On 1 October 2009 two such sticky traps had caught 77 cockroaches all of the same species.

On the basis of habitus and habitat the tropical cockroach *Shelfordina orchidae* (Asahina) seemed to be a reasonably good match. This is a species described from an orchid house in Japan outside its natural area of distribution and subsequently found in orchid houses in New South Wales and Queensland in Australia (Roth, 1990). Following discussions, it was made clear that a truly secure identification could only be achieved by microscopic examination of male genitalia preparations. I therefore sought the advice Dr Horst Bohn, the leading European blattellid specialist, who undertook the necessary genitalia preparations and successfully identified the cockroaches as the Indo-Pacific *Margattea nimbata* (Shelford) introduced here as a species new to the British fauna (Plate 8, Fig. 1).

The cockroaches were most prevalent in areas of highest humidity where an ecological community involving the cockroaches, beetles, spiders, other invertebrates, passerine birds and grass snakes began to develop. This was terminated abruptly when the orchid house closed down following the untimely death of the owner during October 2011.

THE PERSHORE ORCHID HOUSE

The Pershore orchid house grew only containerised *Phalaenopsis* orchid cultivars and covered an area of approximately half an acre. Young plants were grown in a distinct area where the temperature was a fairly constant 28°C; in a second area maturing plants were grown in a temperature of 22°C. Overhead irrigation took place during mornings only for approximately six minutes at a time; by noon the plants were left to dry and were never wet overnight. Cockroaches occurred mostly amongst the plants grown at 28°C in an environment that mirrored the moist humid

tropics. Relative humidity was never less than 65%. This climatic regime was maintained constantly and the cockroaches bred in the bark-based orchid rooting medium. Yellow sticky traps were either suspended over the growing benches at a height of 30–60 cm above the plants or were supported by canes sunk into the pots (Fig. 2); these trapped both adults and nymphs.

IDENTITY AND ORIGIN OF THE PERSHORE COCKROACHES

Two adult male cockroaches were sent to Dr Bohn during December 2009. He prepared their genitalia (Fig. 1, A and B) and named them *Margattea nimbata* ssp. *nimbata* (Shelford), thereby establishing the distinction from *Shelfordina orchidae*. He stated that they most closely resembled examples (Roth, 1989 Fig. 23) from populations on the Krakatau Islands (6°10'S 105°41'E) situated between Sumatra and Java in Indonesia. There are no previously published breeding records of *M. nimbata* in the British Isles. Most of the Krakatau Islands support tropical monsoon forest in varying degrees of representation for which the climate in the orchid house near Pershore provided an invariable analogue. This is underpinned by the coexistence there of another now widespread tropical invertebrate, the salticid spider *Hasarius adansoni* (Audouin) which occurs throughout Java and Sumatra and in the tropical moist forests of the Krakatau Islands (Žabka & Nentwig, 2002). This spider also gradually increased in numbers in the orchid house during 2008 to 2009.

Direct links between the Krakatau Islands and Pershore cannot be envisaged. Plants and materials for *Phalaenopsis* cultivation in Britain are sourced largely from the mainland of north-west Europe and this applied to the Pershore site. Orchid cultivars are bred in north-western Germany and their subsequent micro-propagation occurs elsewhere in that country. Bark-based growing media are sourced from Holland. Taiwan, some 4000 km to the north of the Krakatau Islands, is sometimes mentioned as a source of European cultivated *Phalaenopsis* stock but at Pershore little use was made of this source. It is observed that the Pershore cockroaches do not represent the Taiwanese subspecies *M. nimbata* ssp. *shirakii* (Princis). *Margattea nimbata nimbata* has therefore undoubtedly reached Britain via a series of orchid cultivation 'stepping-stones' which create uniformly acceptable conditions for inconspicuous ootheca which might be transported easily from place to place.

THE BIOGEOGRAPHY AND NATURAL HABITAT OF *MARGATTEA NIMBATA*

Apart from the Krakatau Islands, *M. nimbata nimbata* is known especially from the tropical moist forests of Borneo (together with several other species of *Margattea*), from Christmas Island, from Thailand and from Australia's Northern Territory (Roth, 1989). It occurs widely in Japan (Roth, 1991) and has been introduced on the island of La Réunion in the Indian Ocean. The subspecies *M. nimbata shirakii* occurs on Taiwan, Amami, Okinawa and Yayeyama. (Roth, 1991).

Margattea nimbata nimbata is preferentially an inhabitant of tropical moist forests with no marked predilection for orchids. Some finds have been 'in shrubberies' indicating a preference for cultivated, disturbed land, a tendency confirmed by its occurrence in sugar cane fields on the Indian Ocean Island of La Réunion (21°6'S 55°32'E), 6500 km distant from Indonesia. There it is considered to be hygrophilic and favoured by artificial irrigation (Boyet & Rivault, 2006a, 2006b). It is thus confirmed that it is the artificially-created environmental conditions in British orchid houses that favour this species and not orchids *per se*. *Margattea nimbata* is not regarded by FERA as a notifiable 'pest' (Sharon Reid, *pers. comm.*, 17 December 2009) because it is impossible for it to naturalise in the prevailing British climate.

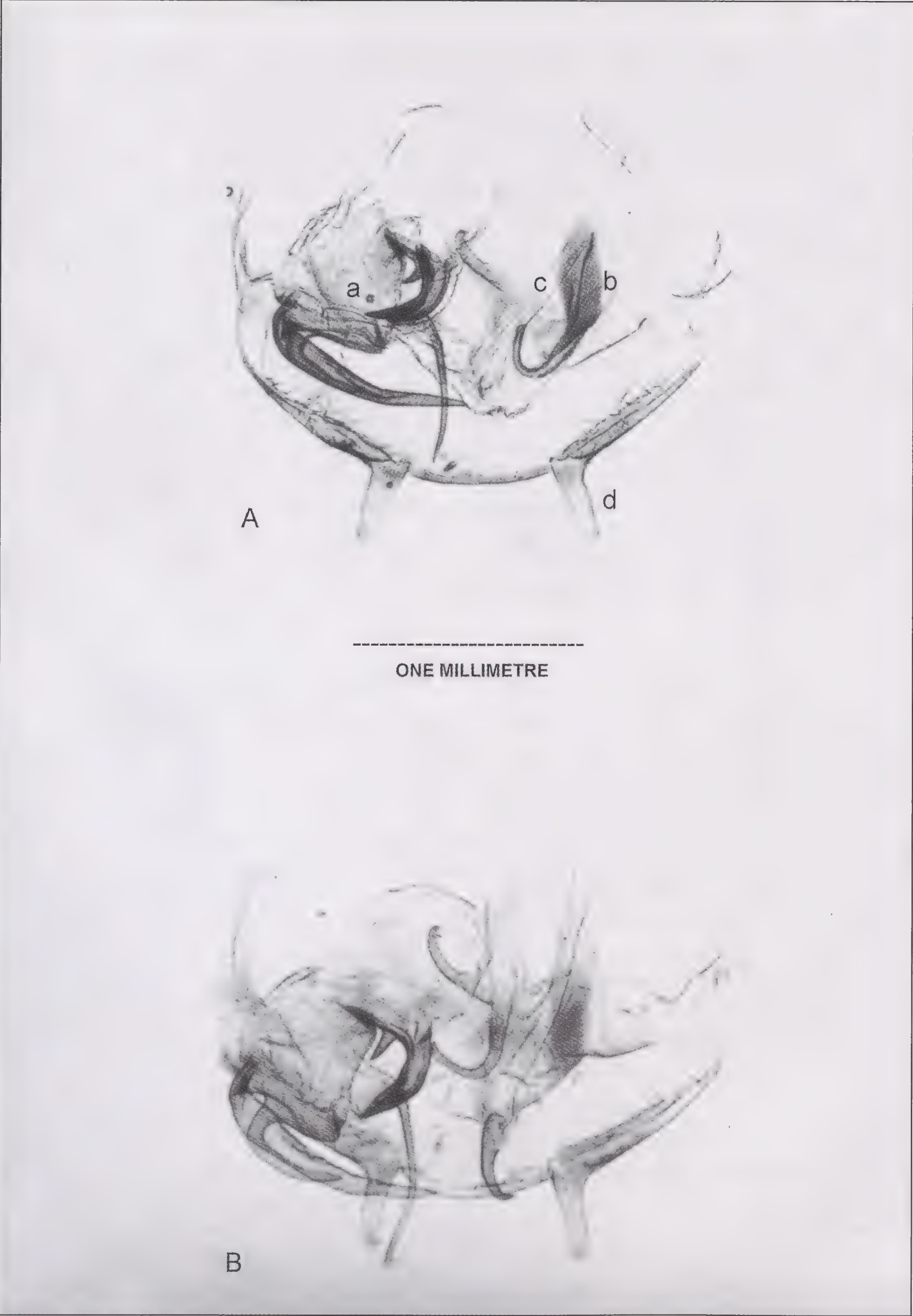


Fig. 1. Subgenital plate and genitalia of male *Margattea nimbata*, Pershore, October 2009. Minor structural variations can be observed in specimens A and B. a: left phallomere with processes, b: right phallomere, c: median phallomere the apical process present in specimen B, d: style.

THE ECOLOGY OF THE ORCHID HOUSE AT PERSHORE

One of the more interesting questions about the large populations of *M. nimbata* that built up at Pershore during 2008–2009 is how they sustained themselves. Some minor imperfections were found on flowering plants and it was thought that pollen may have constituted part of their diet, the rest resulting from detritivory. One of the more remarkable aspects of the coenosis during 2009 was the discovery by a population of hatchling grass snakes (*Natrix natrix* L.) that conditions in the orchid house were distinctly favourable and that cockroaches were highly palatable. The young snakes came to recognise that cockroaches struggling on the suspended sticky traps could be picked off if they were not too ensnared, although some paid the ultimate price (Fig. 2).

Had orchid production continued at Pershore no doubt more ecological information would have been forthcoming. It appears that the hygrophilous carabid beetle *Poecilus cupreus* (L.) found the orchid house conditions acceptable and was frequently observed and sometimes snared on the sticky traps. Lycosid spiders and passerine birds also developed the habit of attempting to remove insects from the sticky traps; one such fragmentary insect was a male *Quedius simplicifrons* Fairmaire (*sensu* Smetana (2004)). This is a halophilous rove-beetle occurring in the splash-zone of open coasts penetrating estuaries upstream to within limits of tidal influence. It is hardly ever intercepted inland in Britain; was this favoured by the recurrent ‘splash-zone’ of overhead irrigation in the glasshouse?

MARGATTEA NIMBATA ELSEWHERE IN BRITAIN

During October 2007 observations made in *Phalaenopsis* orchid houses in Hampshire (Sharon Reid, *pers. comm.*, 17 December 2009) mirrored the Pershore experience and involved the transport of cultivated orchids from the same locations in continental Europe (T. Morris, *pers. comm.*, September 2008) to these glass houses. The ultimate origins of these orchids were thought to be China or Taiwan. Cockroaches were trapped on sticky traps placed above the plants and under benches and by the end of 2009 their numbers had greatly decreased and the species is evidently no longer problematical. An adult and nymph from this infestation believed to be *M. nimbata* are illustrated in Fig. 3 and Plate 8, Fig. 2 respectively. Otherwise there are no other known British populations although interceptions of small numbers of what may be this species have been made at Felixstowe port and Royal Botanic Gardens, Kew (C. Malumphy, *pers. comm.*).

CONCLUSIONS

The Indo-Pacific cockroach *M. nimbata* bred in *Phalaenopsis* orchid houses in Worcestershire from 2007 to 2010. They most closely resemble specimens from the Indonesian Krakatau Islands and are likely to have reached here *via* staging posts in the extended trade in *Phalaenopsis* orchids. These staging posts replicate environmental conditions with the same degree of precision wherever they are so that *M. nimbata* can thrive wholly uninfluenced by the constraints of regional climate. A breeding population of cockroaches from an orchid house in Hampshire, believed to be of the same species, is no longer regarded as problematical (Sharon Reid, *pers. comm.*, 21 January 2013). The Pershore population of *M. nimbata* is now extinct and the Hampshire population is assumed to be.



Fig. 2. Sticky trap with entrapped mostly adult *Margattea nimbata*, lycosid spiders and two juvenile grass snakes, Pershore, 1 October 2009.

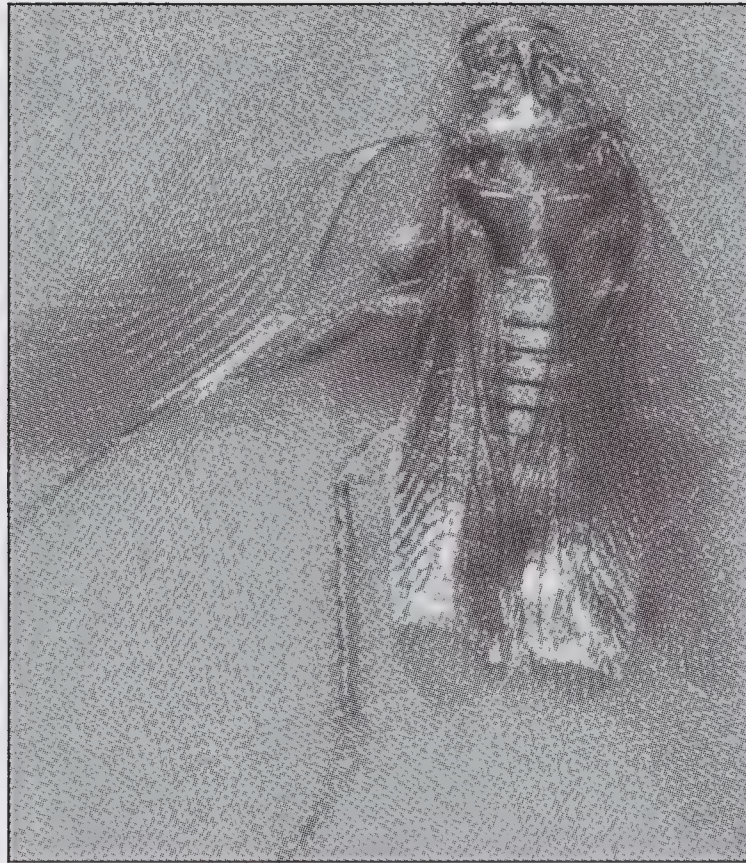


Fig. 3. Adult male *Margattea nimbata* cf. *nimbata*, orchid house, Hampshire, October 2007. © FERA.

ACKNOWLEDGEMENTS

The author is indebted to Dr Horst Bohn of the Zoologische Staatssammlung Muenchen, Germany, for determining the identity of the Pershore cockroaches and for the provision of Figs 1 A and B. Sharon Reid of the The Food & Environment Research Agency, Sand Hutton, York, kindly provided Figs 4 and 5 and a helpful dialogue. Dr Peter Merrett kindly determined *Adansonius hansonii*. Megan Lloyd of the Queensland Museum, South Bank, Queensland provided documentation on *Shelfordina orchidae*. Dr Colette Rivault kindly discussed her Indian Ocean island studies. I thank Janet Morris and her late husband Tim for providing access and background data for this study. I am grateful to the two appointed referees for suggesting various improvements to this paper.

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SHORT COMMUNICATIONS

Bloxworth Snout *Hypena obsitalis* (Hübner) (Lepidoptera: Noctuidae) breeding in Hampshire? – Fresh adults (Plate 8, Fig. 3) were seen on Gilkicker Fort, South Hampshire (SZ6097) in September 2012. The first was disturbed from stonework on 13th, the second (see Fig. 1) found at rest on north facing wall on ivy on 18th, and a third was beaten from a similar situation on 19th September. The fort is large and the moth's foodplant, pellitory-of-the-wall *Parietaria judaica* is extremely abundant on the masonry and brickwork. Given the easterly spread of this species, it is likely that the moth may well have become established and be breeding *in situ*.

The moth has been recorded from ten localities in Hampshire and the Isle of Wight since 2000 and has been found hibernating on two occasions (Tim Norriss, County macro-moth recorder, *pers. comm.*). There is also a clustering of records from the Isle of Wight indicating that it is probably firmly established and breeding in this area. It is hoped to confirm the species status in Hampshire by searching for the larvae in June and July when mature larvae should be evident. – JONTY DENTON, 31 Thorn Lane, Four Marks, Hants GU34 5BX.

A British record of *Phyllonorycter messaniella* (Zeller) (Lepidoptera: Gracillariidae) mining leaves of cork oak *Quercus suber*. – On 26 March 2013, a large number of leaf mines were noted on a known specimen of cork oak *Q. suber* in East Park, Southampton (SU421124). A small number of leaves with live mines were collected (Plate 8, Fig. 4) and the miners identified as *P. messaniella* from the pupae and subsequently raised adults. In Britain, *P. messaniella* is well known from a number of tree genera, mainly *Quercus*, including both deciduous species and the evergreen *Q. ilex*. (Emmet *et al.*, 1985; Emmet, 1988; Pitkin *et al.*, 2012). Although Palmer *et al.* (2012) note that the larvae of *P. messianella* appear to have adapted to feed on introduced oaks, I am unaware of other records of *Q. suber* as a host in Britain. It is however a known host in continental Europe (Ellis, 2012). – DAVID S. HUBBLE, 28 St. Mary's Road, Eastleigh, Hampshire SO50 6BP. dshubble@yahoo.com.

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***Chlamydatus evanescens* (Boheman) (Hemiptera: Miridae) – are reports of its rarity greatly exaggerated?** – On 17 June 2012, I visited the site of a derelict World War II airfield at Bradwell Grove, near Carterton, Oxfordshire (SP248067) and, among other chores, decided to do some suction sampling of the short vegetation that was covering much of the concrete sections of the disused runway. This consisted of the

mosses *Syntrichia ruralis* (Hedwig) F. Weber & D. Mohr (Pottiaceae) and *Homalothecium sericeum* (Hedwig) Schimper (Brachytheciaceae), amid which was growing stonecrop, *Sedum* spp. (Crassulaceae). I had attempted to sample this pabulum in the previous year at a similar site in Stanton Harcourt, Oxfordshire, an area of derelict buildings served by concrete roadways (SP414054). However, my suction device at that time, a Halfords car vacuum cleaner (Ryan, 2011), became clogged with the fleshy leaves of the stonecrop which readily detached during the assault. My new device, a Vax LiFE handheld vacuum cleaner (Ryan, 2012), proved more resilient to this defence and I was able to gather from the Bradwell Grove runway several sandwich-boxes full of vegetable matter, emptied from the collecting chamber of the vacuum cleaner.

That evening, I began the microscopic examination of this material and at length isolated two mysterious, small (2mm long), black, brachypterous bugs from the mass of stonecrop leaves (Fig. 1a). These were of a similar size to several pink-red nymphs I had noticed earlier, but had ignored (Fig. 1b). A second, more careful pass through the material isolated twelve more of these, and they, together with the adults, were kept in a plastic box with some stonecrop leaves, for subsequent study. A quick check with Southwood & Leston (1959) confirmed the adults as being *Chlamydatus evanescens* (Boheman), a rare bug known to be associated with stonecrop. Within a few days, the nymphs started to become adult, and were confirmed as being of the same species.

Kirby (1992) categorizes the insect as RDB3, and gives the existing British records as being from north Wales (in 1890 & 1924) and the Peak District (in 1930 & 1936). A survey of the national literature of the last twenty years revealed some more recent records from these areas (Foster & Howe, 2005; Howe & Loxton, 2009), together with new records from the Hampshire coast (Nau & Brooke, 2006) and 'eco-roofs' in London (Jones, 2003), all associated with stonecrop. I reported my find to John Campbell (county recorder), Jim Flanagan (national recorder) and Bernard Nau (former national recorder), and the species was confirmed as being new to Oxfordshire (Watsonian Vice-County 23). Kirby also reported that the bugs can be reared in captivity on the broad-leaved *Sedum sempervivum* L. In the mood for an experiment, I transferred the adult bugs I had in culture to a sprig of 'ice plant', *Hylotelephium spectabile* (Boreau) H. Ohba (Crassulaceae), from my garden, upon which they thrived, with first instar nymphs starting to appear on 12 July.

Given the apparent rarity of this insect, I considered my discovery to be incredibly fortuitous. However, my mind was turning to Stanton Harcourt, where I had failed to sample this pabulum in the past, and I wondered if I might be able to record *C. evanescens* from here also. I arrived there on 5 July, and although most of the habitat had been fenced off since my last visit, I set to work on what was accessible. Nothing was found amid the thin patches of stonecrop along the edges of the roadways, but where broader expanses of the plant occurred, I found three nymphs of the bug (two reared to adult), confirming this as a second Oxfordshire site.

The hunt was now on for more sites. My Ordnance Survey maps were scrutinised for features likely to represent concrete roadways/runways, followed up by visits in the car. In this way, I discovered two more sites where expanses of *Sedum* were present, both of which were found to support *C. evanescens*. The first site was a concrete roadway leading to a farm, outside Berinsfield, Oxfordshire (SU576957), with wide expanses of moss and stonecrop, easily accessible, like those at Bradwell Grove. Here, on 12 July, over 200 individuals of the bug were taken, mostly adult, in one hour of sampling. About 10% of these were of the macropterous form, which I had not previously seen. The macropters were, like the brachypters, of either sex, but, unlike the brachypters, had fully-formed

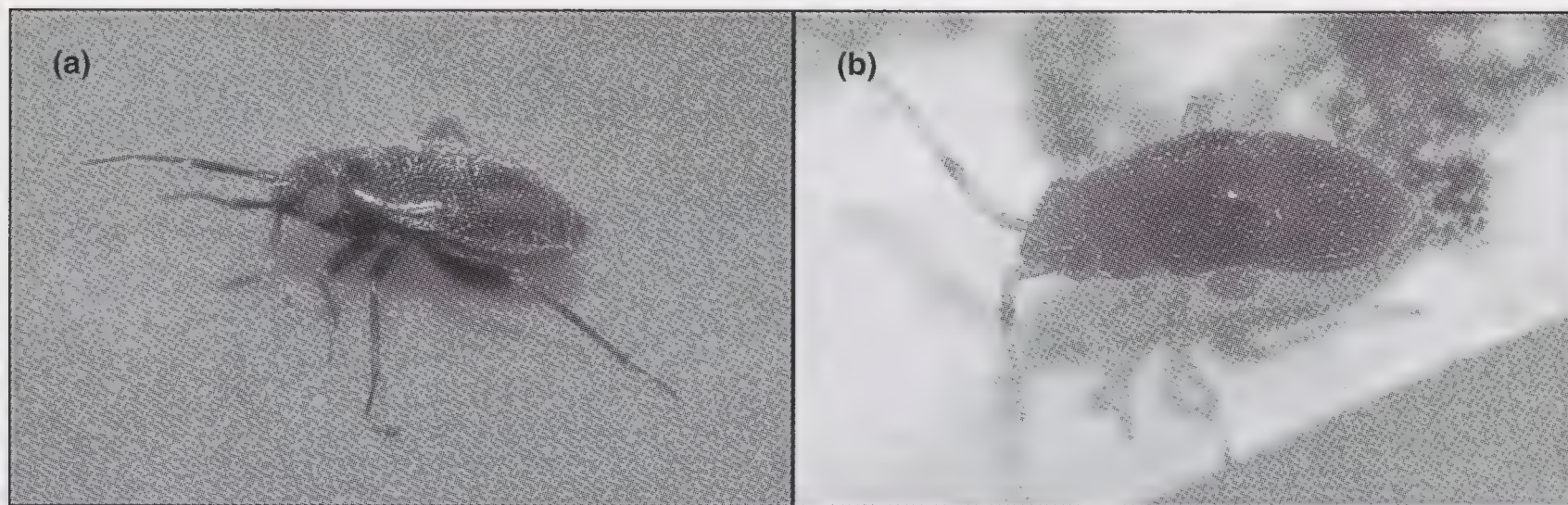


Fig. 1 (a) black and (b) pink nymphs of *Chlamydatus evanescens*, Bradwell Grove, Oxfordshire, 2012. Photo: Rob Ryan.

membranous wings and were presumably capable of flight. The hemelytra were dark brown, in contrast to the black of the brachypters, with lighter areas tinged with red at the extreme apex of the clavus and extreme base of the cuneus. In some individuals, the lighter markings also extended across the medial half of the cuneus. The membrane veins were also of this colour, and the membrane itself was dusky.

The second site, which seemed to be another derelict airfield, was outside Chedworth, Gloucestershire (SP038131). On the day of my visit, 22 July, the site was, fittingly, hosting a meeting of model aeroplane enthusiasts, so I confined my search to the public road that ran beside the site, rather than to the airfield itself. The accessible stonecrop here was similar to that at Stanton Harcourt, thin clumps along the edge of the road, with a broader expanse where vehicles had not disturbed the growth. The results were also similar, with only a small number of bugs found (two brachypterous adults), confined to the broader expanse of the plant. No doubt, this is the first record of *C. evanescens* from Watsonian East Gloucestershire (VC33).

By this stage in the season, the stonecrop was bearing numerous white flowers, which from their pink tinge were identified as English Stonecrop, *Sedum anglicum* Hudson. By revisiting the other three sites, I confirmed that this was the dominant species there also. The yellow flowering Biting Stonecrop (Wallpepper), *Sedum acre* L., was also present at Bradwell Grove and Berinsfield, in small patches, but it was not found to host the bug. The moss *H. sericeum*, found to be common at Bradwell Grove, was more difficult to find at the following three sites, where *S. ruralis* alone seemed to form the 'soil' in which the broad expanses of stonecrop grew.

Given that my search for additional *C. evanescens* sites had been successful three times out of three attempts, I conclude that wherever broad expanses of stonecrop occur in my area, I am likely to pick up *C. evanescens* in my vacuum cleaner. Furthermore, since the bug has been recorded in Britain as far north as the Peak District and north Wales, the bug may be widespread across southern Britain, albeit localised to this particular habitat. Consequently, the supposed rare status of this species in Britain should be reviewed.

The question arises as to why the bug has, hitherto, escaped with so little attention from British entomologists, given the ease with which I have found new sites for it. Although the host plant itself has not been ignored, as indicated by previous records, the habitat of stonecrop on concrete in derelict areas has clearly been overlooked. Hence, *C. evanescens* may fall into that category of insects whose supposed rarity arises because the habits of the bug and the habits of the entomologist do not concur.

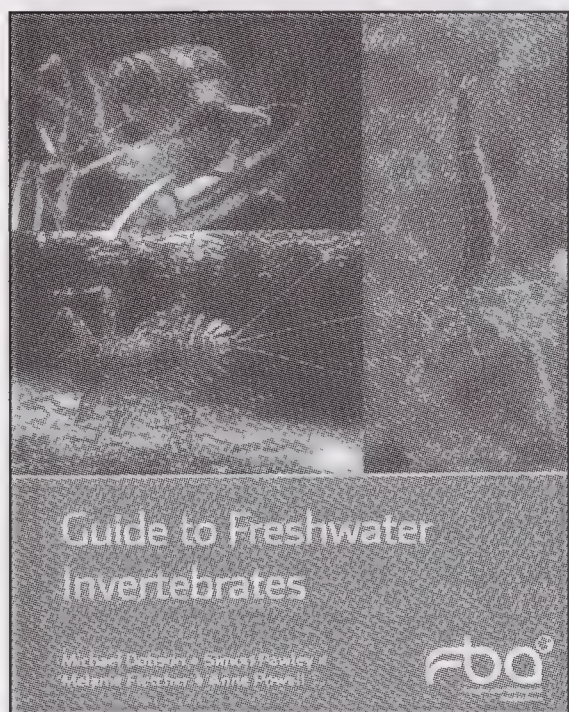
I would like to thank John Campbell, Jim Flanagan and Bernard Nau for their comments, and I should perhaps also apologise to the estate of Mark Twain for the

paraphrased title of this note. Images of the bug have been uploaded to the Flickr website (<http://www.flickr.com>). – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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BOOK REVIEW



Guide to Freshwater Invertebrates. FBA Scientific Publication No 68 by Michael Dobson, Simon Pawley, Melanie Fletcher and Anne Powell. (Freshwater Biological Association, 2012) 216pp Hardback £33. ISBN 978-0-900386-80-0.

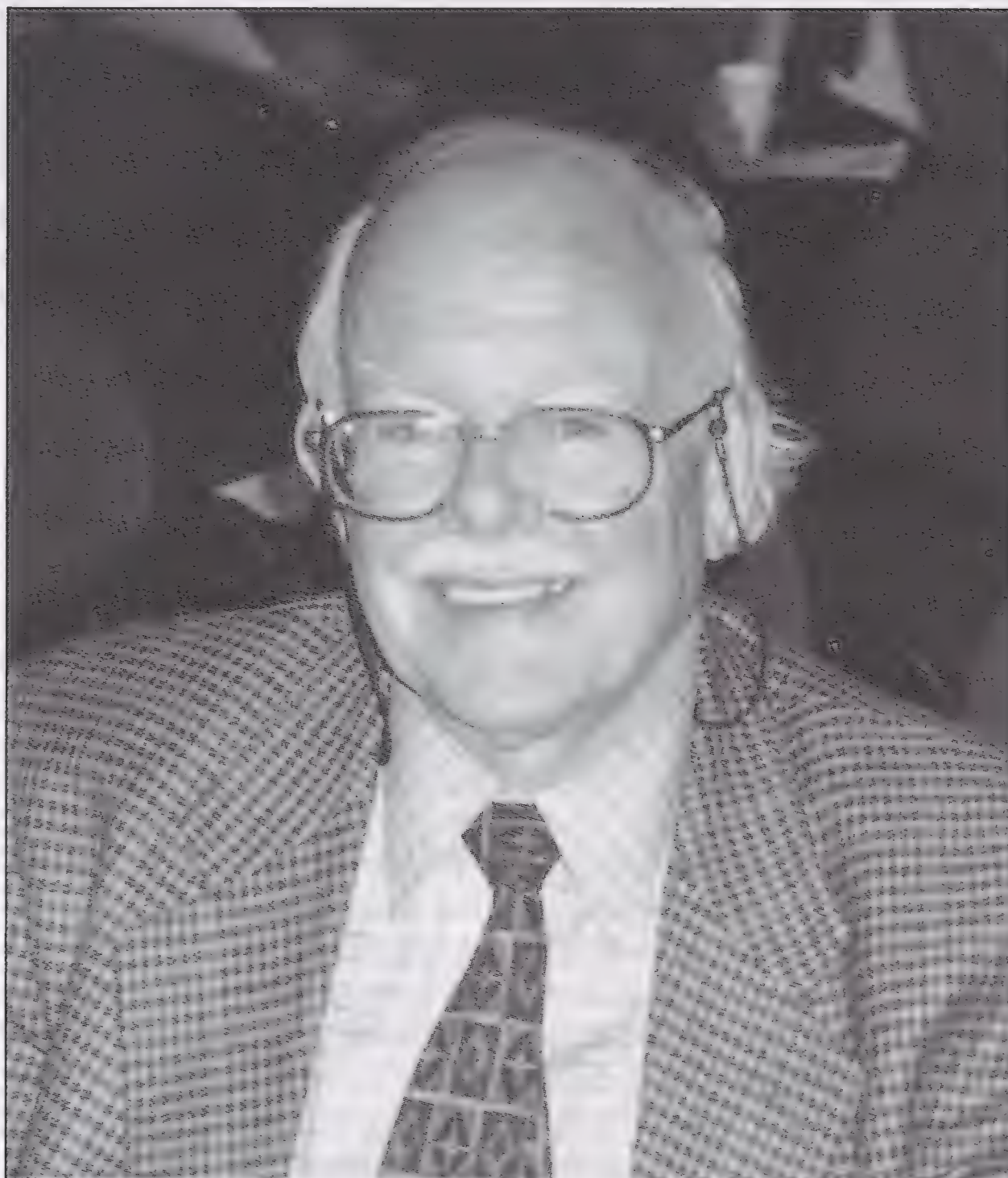
This publication updates T. T. Macan's classic Guide first published in 1959. That book together with Fitter and Manuel's 'Collins Field Guide to Freshwater Life' have been firm favourites as introductory identification guides with students for decades and this update is long overdue and very welcome. It partially repeats the taxonomically more limited previous FBA publication (No 67) 'A Guide to Freshwater Macroinvertebrates for Biotic Assessment'. The format of the update follows the original Macan Guide in having a series of largely dichotomous but also descriptive keys to each taxonomic group. These are supported with a number of clear line drawings, which are a very useful aid to recognising some diagnostic features. Identification is generally to at least family and often to species level. Where further identification work is required a list of more detailed guides is given in the good Bibliography, which has increased from Macan's original five titles to over forty.

Overall, this is an accessible guide for the beginner as well as for the rusty and occasional user. I hope that, like the earlier Macan Guide, this publication inspires a new crop of freshwater biologists and it is sure to become a standard guide for students. It deserves a place on the shelves of all those with an interest in British and Irish freshwater invertebrate ecology and I heartily recommend it.

JON BRAMLEY

OBITUARY

ERIC GEORGE PHILP
1930–2013



Eric Philp, former President of the British Entomological and Natural History Society (2000) and Keeper of Natural History at Maidstone Museum, Kent (1958–1993) died on 8th January 2013 aged 82. He will be greatly missed by all field naturalists; entomologists and botanists alike. He was a field biologist par excellence, with expertise on the identification of most groups of British insects, arachnids, centipedes, millipedes, woodlice, molluscs, acoelomates, plant galls and vascular plants, as well as being a practised bird ringer and mammal recorder. His extremely broad knowledge of British wildlife is best exemplified by his position as third in the all-time pan-species recorder's rankings, having identified 6,878 taxa in UK. Remarkably, most of his records came from Kent. Deep down though, Eric would claim to be a coleopterist.

Eric was born on 24th June 1930 in Dartford, Kent where his father was building foreman at Joyce Green Hospital. Initially he attended the local primary school, St. Albans, but, like so many of his contemporaries, his education was disrupted by war and he and his younger sister Edna were evacuated north to Stafford. Sadly they lived on opposite sides of the town and attended different schools and so rarely met during this period. More importantly, evacuees were not allowed into the scholarship stream for grammar school and so when Eric returned to Kent he was required to

complete his formal education at Maidstone Technical College, somewhat at odds with his more academic interests. During this time he excelled at sport, especially athletics, winning the college 440 yards race and was crowned *Victor Ludorum*. His sister recalls timing Eric on his training runs along with his friend, Frank Sando, who subsequently represented Britain at the Olympics (coming fifth in 10,000m at Helsinki) – with Eric often in the lead.

Eric joined Maidstone Army Cadet Force as a bugler, which involved a fair amount of marching up and down across town and this no doubt put him in good stead when he undertook his national service in the Royal Army Service Corps. He used to say that he had an overseas posting – not quite correct, but nearly so – it was to the Isle of Wight.

Initially Eric worked in the family grocery shop and would often call in at Maidstone Museum in the centre of town to discuss natural history matters and peruse the insect collections. At this stage he owned a bird ringer's licence and had bought a Robinson MV light-trap to boost his moth collection. Here he fell under the influence of Tony Tynan, Keeper of Natural History, Alan Grove, Maidstone Museum Curator and Dr A. Morel Masee, chief entomologist at nearby East Malling Research Station. It was Dr Masee who sparked Eric's lifelong interest in Coleoptera and Heteroptera.

Not surprisingly a career change beckoned and Eric joined Maidstone Museum as an assistant in the natural history section in 1954. He was responsible for answering all queries on natural history and during his first year worked hard at bringing his then limited knowledge of botany up to the necessary standard. This happened to be a wise move on his part as this period coincided with the realisation (nationally) that regional museums had an important role to play in educating the local community and the natural history section flourished over the following decades.

Tony Tynan and Eric used to stay on in the evenings to meet other local wildlife enthusiasts and it was at this time they decided along with George Morgan to form a Kent natural history society. Eric corresponded with all those likely to be interested and as a result 76 people joined the Kent Field Club (the Natural History Society of Kent) at the inaugural meeting held in January 1956. Those joining included John Felton, Malcolm Chalmers-Hunt, Dr Masee, Colonel Duffield, John Sankey, Dr E. Scott, David McClintock and Francis Rose. Two youngsters who subsequently joined the junior section were (Professor) Clive Stace and (Professor) David Streeter.

Eric was appointed Keeper of Natural History at Maidstone Museum in 1958, a post he held until his retirement in 1993. Eric had firm ideas about what a museum was for, and that it should be a centre for reference collections, records and an identification service for whatever was brought in by the public. He subsequently set up the Kent Biological Archives at Maidstone Museum, the first centralised database for storing the county's wildlife records in 1971 (see *Bulletin of the Kent Field Club* 1969, 1970, 1971 for background details). This was a hard copy system, comprising sets of individual species cards arranged by taxa group and a folder for each tetrad, where details of all the known records of plant and animal species from sites within the tetrad (e.g. a wood, SSSI, a recorder's garden) were stored, together with relevant correspondence. The known distribution of each species in the county was summarised in tetrad map form (for the first time) on the front of each species card, with a brief listing of locality, date and recorder's name for all the individual records below. This was a massive undertaking in the days before computerised databases. Eric was pleased to note that when the Nature Conservancy began transferring county data onto its national database in the 1980s, the usual 1–2 day's visit to a county records centre extended to a month in the case of Kent.



Eric shaking hands with Maidstone Museum's latest acquisition – an *Iguanodon*, February 1978.

During his time at the museum Eric strived to improve the quality of the collections, particularly those of the Insecta which suffered extensive damage during a fire in 1979. Following this disaster he was amused to be given the full red carpet treatment when he visited Watkins & Doncaster, blank cheque in hand, to order a full set of replacement cabinets for the museum. The herbarium (unaffected by the fire) was completely modernised and a huge amount of new material was incorporated largely as a result of the field work undertaken for the new Atlases. Eric also made a special effort to ensure that specimens of difficult taxa such as *Rubus*, *Taraxacum* and *Hieracium* from Kent localities were included, as these genera (apart from *Hieracium*) were under-represented in the collections. Consequently national experts were encouraged to visit and to undertake field work in Kent, and whilst there to look at herbarium specimens and check identifications of critical taxa. As a result the herbarium now houses a very comprehensive collection of Kent plant material that is consulted regularly by botanists from across the South-East. It is hoped that the museum authorities, despite several recent changes, will continue to recognise the importance of the botanical archives and ensure that herbarium sheets are properly maintained for future generations to consult.

Much of Eric's energy in his early career was channelled through the Field Club. He was Joint Secretary with George Morgan from 1957–1959, and with John Felton from 1960–1964. He took on the Editorship of the Bulletin from 1961–1964, and was Assistant Editor of the KFC Transactions from 1967 to 1971. Eric eventually became Honorary Director of Field Studies (1970–1986), a post created with the aim of overseeing the Field Club's ever expanding programme of field surveys and field meetings. This fitted in nicely with his position at the Museum and for example allowed him to direct plant recording for the Field Club's *Atlas of the Kent Flora*

published to great acclaim in 1982. He also organised the first meetings of the Kent Lepidopterists and Kent Coleopterists Groups. Eric was elected an Honorary member of the Kent Field Club in 1988 and President from 1990 to 1992.

Not long after completing his national service Eric met his future wife, Dorothy Francis, who also lived in Maidstone. On their first walk together Eric asked her to climb up and put her hand in a hole in a tree simply to find out what was there – it was too small for his hand – he had no idea what was inside but it was bound to be interesting – so Dorothy knew right from the very beginning what she was letting herself in for. They married in April 1956 and set up home on the outskirts of Maidstone. One early holiday was spent on St. Agnes on the Isles of Scilly, where they spent a whole night marooned on Annet, ringing seabirds, a never-to-be forgotten experience. Family holidays were always a mixture of fun, relaxation and recording.

Eric's encyclopaedic knowledge about the status and distribution of the county's flora and fauna was second to none, and meant that he was continually in demand as a public speaker. For many decades he spoke enthusiastically and authoritatively at Maidstone Museum and Kent Field Club events and to audiences across the county about Kent's wildlife and its conservation. His publications include the *Atlas of the Kent Flora* (1982), *The Butterflies of Kent* (1993), the *Provisional Atlas of the Amphibians and Reptiles of Kent* (1998), the *Provisional Kent Mammal Atlas* (2002) and *A New Atlas of the Kent Flora* (2010). He is the only entomologist to have published two county plant atlases, a feat that will surely not be surpassed for a long time to come.

Eric's broad range of interests meant that he was an active member of many national (and local) biological societies. He was a founder member of the Kent Ornithological Society, founder member and Vice-President of the Kent Geologist's Group and a Fellow of the Royal Entomological Society. Although he published occasionally he was obviously more at home in preparing displays of rare or unusual animals and plants that he had found and a quick search of own proceedings reveals that he was a very regular exhibitor at BENHS annual exhibitions. At various times during his career Eric was Kent county recorder for vascular plants (BSBI recorder for VCs 15 and 16), plant galls, Orthoptera, Heteroptera, Coleoptera, Siphonaptera, Arachnida, Myriapoda, Mollusca and Vertebrata excluding birds. This involved him in maintaining reference collections, mostly at the museum, and corresponding with the many field biologists who happened to visit Kent each year. He remained county recorder for many groups up till the time of his death. The bulk of his insect collection is now housed in the Natural History Museum, London and his card indexes and computer records have been passed to the Kent & Medway Biological Records Centre in Faversham.

Naturally Eric was heavily committed to conservation. His room at Maidstone Museum hosted many early discussions about the need for nature reserves in Kent, with representatives from the Kent Wildfowlers Association, Kent Ornithological Society and the Kent Field Club. These eventually led to the formation of the Kent Trust for Nature Conservation (now the Kent Wildlife Trust) in 1958. Eric was heavily involved as might be expected and acted as Chairman of the Trust's Conservation Committee for a number of years. He was also instrumental in persuading Lady Darnton to donate a significant sum from her estate to the Trust in the 1980s. Unfortunately Eric was a man of strong opinions which sometimes led to disagreements about management of the countryside with other members of the Trust, but his underlying commitment to conservation was never doubted.

Eric was always an entertaining companion to be with in the field, never more so than on our three trips across to mainland Europe. On one occasion we were invited

to the Rijks Herbarium in Leiden (the Dutch equivalent of Kew) in order to be shown rare coastal plants which might occur as yet undetected in Kent. The weather was so cloudy, that no-one in the party, all expert map readers could work out which way was north through the suburbs of The Hague to Leiden. It was complicated by the fact that the map sent to us by our hosts was a xerox copy and all roads, railways, rivers and bus routes were shown in 'black'. Eric suggested that as I was an employee of a Dutch company I should go and talk to the natives. After consulting the nearest house, where they spoke beautiful English, I returned to explain we could either drive 'that way', the way we were going, or turn around and drive in the opposite direction! We eventually made it. Our hosts were marvellous, despite us all being amateur botanists (apart from Eric) and we learnt a few good ideas about field meetings. Coffee and schnapps beforehand for starters. We ended up taking photographs of bulb fields in black and white.

For many of us in Kent, Eric has always been with us, he was the 'Kent Field Club', and we shall greatly miss his presence at KFC meetings. He was already looking forward to participating in the 2013 field season. He was an extraordinary field recorder, often finding unusual or overlooked species right under our very noses. He was a pioneering conservationist, an inspirational teacher and fantastic flag waver for the Kent Field Club.

He is commemorated in the plant world, first by an oak tree on his grave at Deerton Street, Kent, and secondly by *Rumex* × *philpii*, a hybrid between *R. patentia* (Patience Dock) and *R. conglomeratus* (Clustered Dock) discovered by Eric near Snodland, Kent in 1978 (Kitchener, 2007). Our condolences go to his wife Dorothy and son Stephen and family. Eric will be greatly missed; Kent will never be the same again.

JOHN BADMIN

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**Eric Philp and his part in the strange re-discovery
of the Fiery Clearwing *Pyropteron chrysidiformis* (Lepidoptera: Sesiidae)
in North Kent**

Whilst having no claim to knowing the late Eric Philp the well known coleopterist and Kent County Recorder personally, I briefly made his acquaintance during our period on BENHS Council together and his Vice-Presidency and subsequent Presidency of the Society in 2000.

It was whilst attending a Council meeting in late June 1999; these then being held at that time in the charismatic surroundings of the Library of the Royal Entomological Society, 41 Queen's Gate, South Kensington, and for some reason we were both early and the only two members then there. As one does we exchanged normal pleasantries including such as how the season had developed, what we had been up-to (entomologically speaking of course) and things of a general nature.

During our conversation he mentioned that he was somewhat concerned that recently in the course of sweeping for invertebrates he thought that he may have inadvertently taken what he thought may have been a specimen of the Fiery Clearwing *Pyropteron chrysidiformis* (Esper), subsequently realising that this was a species of Lepidoptera afforded full protection under Schedule 5 of the Wildlife and Countryside Act 1981.

My initial reaction was of re-assurance pointing out that quite often coleopterists when sweeping turn-up species of clearwing and that when in the process of recording in the Folkestone area it was quite possible that this specific species could be encountered.

His reply can only be described as historic and I quote: "Oh no – I was not down near Folkestone but on the north Kent coast."

Needless to say I was astounded knowing full well that at that time the species was only currently recorded in the UK from one locality on the east Kent coast; although I understand that previous old records have been allocated to the north Kent area in the 1940s. Having digested this news I agreed with Eric that perhaps the best course of action would be to contact Tony Rouse who was then contracted to Natural England (English Nature) to monitor the species under the BAP process and species recovery programme.

This I duly did the following day and Tony having discussed the matter with Eric visited the site on 6 July 1999 and I understand located the species relatively easily (Tony Rouse, pers. comm.).

Since 1999 this RDB1 species has been annually monitored, initially funded by English Nature and subsequently when this support was withdrawn by Butterfly Conservation, with the voluntary assistance of Tony Rouse. The moth continues to thrive at this site.

Whilst I have no doubt that this is by no means Eric's only claim to fame, it tends to reinforce my theory that at least coleopterists sometimes come in useful!!

JOHN PHILLIPS

News of Interest to members

The State of Britain's Larger Moths 2013

MARK S. PARSONS, DAVID R. BROOKS & RICHARD FOX

Butterfly Conservation, Manor Yard, East Lulworth, Wareham, Dorset BH20 5QP
Rothamsted Research, Harpenden, Hertfordshire AL5 2JQ

2006 saw the publication of the landmark *The State of Britain's Larger Moths* (Fox *et al*, 2006), a collaboration between Butterfly Conservation and Rothamsted Research, which identified alarming declines in this country's moth population in the period 1968 to 2002, with many individual species declining dramatically. In February of this year, *The State of Britain's Larger Moths 2013* (Fox *et al*, 2013) was launched at the Society of Antiquaries of London, Burlington House, Piccadilly. This new publication updates the former report and incorporates analysis of a further five years data from the Rothamsted light trap network, to encompass the 40-year period 1968 to 2007, and includes distribution maps from the National Moth Recording Scheme. Broader-scale changes are briefly covered, for example from 2000 onwards over 100 moth species (including micro-moths) have been recorded in Britain for the first time, along with brief discussion on causes of change and on efforts to conserve Britain's scarcer moths, such as highlighting the landscape scale project in the Brecks.

Headline results included a fall in the British larger moth population of 28% over the 40-year period. The decline in southern Britain was 40%, while there was no significant change in total larger moth numbers in northern Britain, where declining species were balanced by species spreading north. Forty-year national population trends were calculated for 337 individual species of widespread larger moths; two-thirds of these species had declined in abundance, including 124 species (37% of the total) whose populations decreased by at least 50%. Sixteen per cent of the total (53 species) more than doubled their populations, some increasing phenomenally (e.g. Least Carpet *Idaea rusticata*).

The publication of the report received widespread press coverage, including on the Today programme (BBC Radio 4), with articles appearing in most national and many regional and local papers. This report, therefore, helped to raise awareness of moths and their status considerably beyond the moth recording community.

The State of Britain's Larger Moths 2013 report is available as a download on the Butterfly Conservation website (<http://butterfly-conservation.org/1776/the-state-of-britains-moths.html>).

Partly in response to the launch of *The State of Britain's Larger Moths 2013* report, Butterfly Conservation launched the Moth Challenge Fund (supported by the Patsy Wood Trust) at the same time. This fund will be used to support moth conservation projects throughout the country and will help lever additional funding (up to £10 for every £1 donated) through for example Landfill Tax, thereby maximising any donations. For further information please visit: <http://www.justgiving.com/moth-challenge-fund>

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FIELD MEETINGS

Coleopterists' Dungeness Meeting, East Kent, 28–29 August 2010

Organiser: **Mark G. Telfer**. – Fourteen coleopterists (Fig. 1) converged on the Dungeness RSPB reserve for this field meeting on the August Bank Holiday weekend. During a period of unsettled weather, the field meeting fortunately coincided with some dry and bright conditions. The impetus for this field meeting came from the results of RSPB's monitoring of the beetles of the pit margins in 2009: pitfall traps which caught 977 specimens of *Omophron limbatum* (F.) (Carabidae) in 2006, caught none in 2009. Would we find *Omophron* in 2010? Silty quicksand margins are the habitat for this and other specialist beetles. Our first sampling site at the best silty bit of the New Excavations was worked by almost everyone and yielded *Augyles hispidulus* (Kiesenwetter) (Heteroceridae) and *Cercyon bifenestratus* Küster (Hydrophilidae) amongst others but no adult *Omophron*, and only two larvae identified much later. We soon relocated *en masse* to a more extensive area of silty margins at the south end of the ARC pit. We soon started to find *Omophron*, albeit in small numbers, by pouring water over bare silty ground, often several metres from the water's edge. After perfecting this technique, Bill Urwin returned to the first spot in the New Excavations and found a few adult *Omophron* there, where we had all drawn a blank earlier in the day!

For the remainder of the weekend, our party dispersed more widely over the area, depending upon personal interests, reconvening for dinner in the Britannia Inn. There were a couple of Icterine Warblers in the gorse between the Bird Observatory (where most of us were staying) and the Inn. The find of the day on Saturday was John Paul's single teneral specimen of *Polistichus connexus* (Geoffroy in Fourcroy) (Carabidae) found in the Trapping Area. A five man search of the area on the



Fig. 1. Left to right: Andrew Duff, the late Eric Philp, Pete Akers, Tony Allen, Mark Gurney, James McGill, Graeme Lyons, Roger Booth, Bill Urwin and Grant Hazlehurst. John Paul and Martin & Julie Collier joined later on.

Sunday morning failed to locate any others, though we did find the ant *Ponera testacea* Emery (Formicidae), recently added to the British list.

Although *Omophron* and other beetles of the silty margins can be found by splashing in daytime, they are generally much easier to find by night. Bill Urwin and James McGill returned to the south end of the ARC pit by torchlight and saw about 80 *Omophron*, far more than we had seen by day.

John Paul and Grant Hazlehurst joined me on a bit of a wild goose chase: nocturnal sweeping of roadside carrot and other seed-heads in the hope of *Ophonus parallelus* (Dejean), a BAP carabid which has been recorded from Dungeness. The evening was memorable for an encounter with a passing motorist: rather than the familiar “Do you mind if I ask what you’re up to?” we got “Are any of you interested in buying an entomological cabinet?” Quite a surrealist marketing strategy for a cabinet-seller!

Bill Urwin and James McGill also torched the old railway sleepers near the Observatory, in the hope of seeing the large bluish tenebrionid beetle *Helops caeruleus* (L.). At breakfast, we learned they had seen the species in good numbers and kept a few to show round.

For Dungeness virgins there was much to see, but for veterans, the pit margins were disappointing by the high standards of years past. There were no sightings of any of these carabids: *Acupalpus maculatus* (Schaum), *Dyschirius obscurus* (Gyllenhal), *Bradycellus distinctus* (Dejean), *Bembidion caeruleum* Audinet-Serville, *Bembidion pallidipenne* (Illiger) or *Bembidion semipunctatum* (Donovan).

From records submitted to the organiser, we recorded 187 species of beetle, and a smattering of invertebrates from other groups (woodlice, bugs, ants, etc.) to bring the total species list up to 212. Perhaps not an impressively long list but awash with rarities, as you would expect from Dungeness. The list included 37 Nationally Scarce or Near Threatened species and four Red Data Book species. A species list and all the records from the meeting can be downloaded (<http://markgtelfer.co.uk/2013/04/06/final-results-dungeness-coleopterists-meeting-2010/>).

I would like to thank Pete Akers and Mark Gurney of the RSPB for hosting the meeting and Dave Walker for letting us take over the Dungeness Bird Observatory.

Regional Meeting at Tullie House Museum, Carlisle, Cumbria, 7–8 May 2011 **Organiser: Stephen Hewitt**

This meeting on the theme of Upland Insects took the form of an indoor meeting in the Museum’s lecture theatre on the Saturday, with a field meeting to Borrowdale and Honister Pass in the Lake District on the Sunday.

The indoor meeting was attended by around 35 members of the British Entomological and Natural History Society and the Carlisle Natural History Society (Fig. 1). BENHS President Tony Pickles began proceedings by welcoming everyone to the meeting and inviting BENHS members attending their first meeting to sign the Members Book. There followed a range of presentations on insects of upland Britain, from the Pennine and Lakeland hills to the Scottish Highlands. These began with a talk on upland insects in Cumbria from Steve Hewitt, after which Ian Wallace spoke on the Trichoptera of Cumbria. After lunch Louis Kitchen gave a presentation on monitoring the Upland Summer Mayfly *Ameletus inopinatus* Eaton. Keith Bland then spoke on upland moths and leaf-miners. The meeting concluded with a talk by David Clarke on northern dragonflies and the conservation of the White-faced Darter *Leucorrhinia dubia* Vander Linden in Cumbria. Following the presentations, several members took the opportunity to view the entomological



Fig. 1. Participants gathered outside Carlisle Museum, 7 May 2011. Photo: Ian McLean.

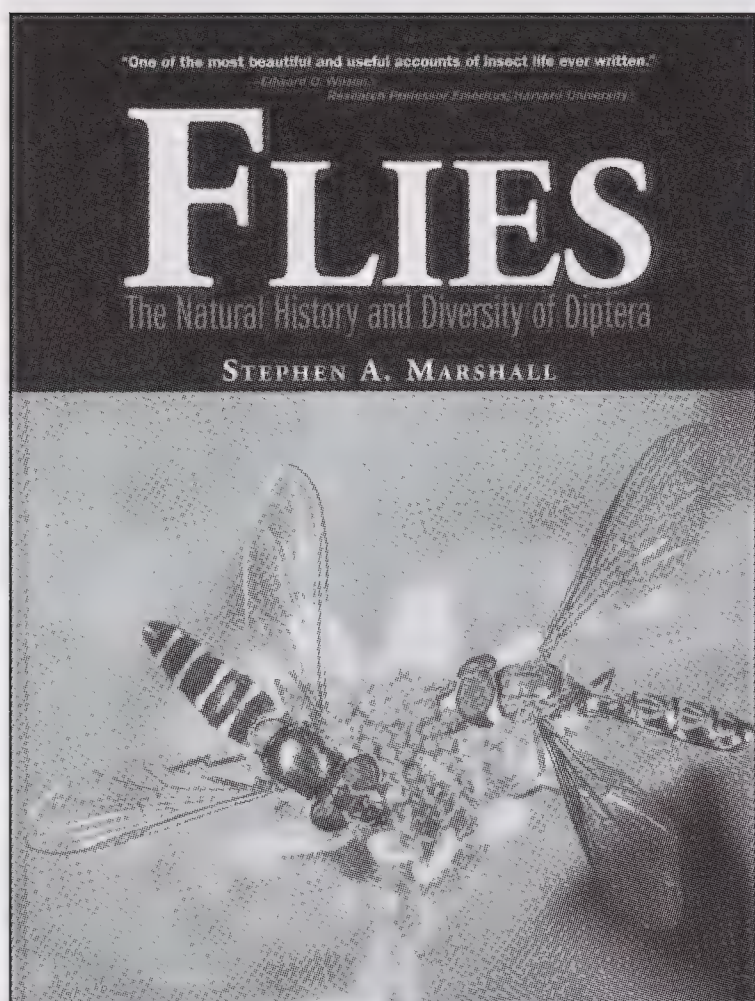
collections at Tullie House Museum, comprising some 200,000 specimens covering the broad spectrum of British insect orders.

On Sunday 8 May a reduced rump of attendees braved a dull, wet morning to venture into the head of the wettest valley in England. First stop was Cummacatta Wood, near Grange in Borrowdale, which is an area of mixed birch woodland and *Sphagnum* mire with boggy runnels. Steady rain here made entomology a more than usually challenging activity. After scratching about to find a few beetles and flies, a switch in searching strategy yielded the larva of the awl-fly *Xylophagus ater* Meigen, under bark.

Next stop was at Seatoller Wood, near Seathwaite. This mixed upland oak woodland has some very fine examples of ash pollards. The rain was easing off at this point and in brightening conditions more insects were beginning to take wing. The robber fly *Dioctria oelandica* (L.) and the hoverfly *Brachypalpoides lenta* (Meigen) were two of the more spectacular species encountered.

Finally, in sunny and breezy conditions, the party took the road up to Honister Pass. The head of the pass, at an altitude of 300m a.s.l., is an area of upland acid grassland, enriched by both acidic mire and seepages as well as base-rich flushes in the vicinity of the mine workings. The latter provided a readily accessible area and produced some interesting upland insects such as the snipe fly *Ptiolina nigra* Staeger as well as the snail-killing fly *Dictya umbrarum* (L.) and the crane fly *Dactylolabis sexmaculata* (Macquart). Keith Bland, who had made a valiant, lone assault on the fells earlier in the day, recorded a number of leaf-miners whilst crawling over the mist-shrouded Honister Pass. Among these were some species new to the county records, maintained by Cumbria Biodiversity Data Centre at Tullie House Museum, including the agromyzid *Napomyza scrophulariae* Spencer, the Knapweed Bell tortricid *Epiblema cirsiana* (Zeller) and the mite *Aceria thomasi* (Nalepa).

BOOK REVIEWS



Flies: the Natural History and Diversity of Diptera by Stephen A. Marshall. 616pp. (Firefly Books Ltd., 2012). Hardback c. £42–£75. ISBN: 978-1-77085-100-9.

With the intention of making the world of flies accessible to a wide readership comes a book written by Stephen Marshall, Professor and Insect Collection Director at the University of Guelph, Ontario, entitled 'Flies: the Natural History and Diversity of Diptera'. Currently priced by UK Internet suppliers at anywhere from £42 to £75, weighing in at some 2.5kg and written in an easy-to-read style, this book describes the world's fly families and subfamilies in three parts, illustrated throughout with numerous good quality colour photographs.

Part 1, entitled 'Life Histories, Habits and Habitats of Flies', comprises four chapters and aims to provide an overview of the

biology of flies in general and how they interact with their surroundings. Drawing on examples from the wide-ranging Dipteran dominion, all the expected topics are present, including development from egg to adult, pollination, phytophagy, saprophagy, predation and parasitism. For me, the accounts of the various fly-borne diseases, not just malaria, along with a section on forensic entomology, formed the highlight of Part 1. Given the wide scope of the subject matter, providing such an overview is no mean task, but this has been accomplished in a clear and concise manner in some 85 pages (approximately 14% of the book).

Part 2, entitled 'Diversity' comprises four chapters and forms the bulk of the book (approximately 75%). The first chapter discusses the origins of the Diptera and their distribution within the various biogeographical regions, including how islands may have become colonised. Regional differences in expertise and existing knowledge of the fly fauna are noted. Suffice it to say that our Palaearctic region is best served in this respect. With no keys to fly genera being available in the least-described Oriental region, dipterists operating there have either a hard time or plenty of opportunities, depending on your point of view. The remaining three chapters cover the Nematocera, split into aquatic and terrestrial families, the lower Brachycera and Empidoidea and finally the higher Brachycera. Each of these chapters is split into two sections, a description of the families and subfamilies, followed by a photographic guide. The descriptions include geographical distribution, habitats and lifestyles, approximate numbers of species and genera and some taxonomic data; references point the way to further reading. The photographic guides contain nine, sometimes ten, 58mm (w) × 44mm (h) photographs on each page. Representative examples of all families (except for the obscure non-UK Rangomaramidae fungus gnats) and a large selection of subfamilies are given via approximately 355 photographs of the Nematocera, 500 of the lower Brachycera and Empidoidea and 1260 of the higher Brachycera. The subject matter includes eggs, larvae and adults, pinned and in situ. Even the world's rarest fly, *Mormotomyia hirsuta* (the hairy hobgoblin fly) is included, a species known only from a small rocky outcrop on top

of one small hill east of Nairobi. No scales are given, except for the occasional inclusion of a coin. The descriptions are concise, which is unsurprising given the scope. There are some omissions, such as no mention of the swarming habits of Fanniidae, but combined with the photographic guides this part of the book manages to impart enough information to enable the reader to gain a good feel for the nature of the different dipteran families.

The final part of the book is the two-chapter 'Identifying and Studying Flies'. The first chapter, which covers collection and preservation, starts with a section giving tips on how to photograph flies and an explanation of how the author's photographs used in the book were taken. Good practical advice here, complete with a warning on relying too much on photographs for identification and noting the requirement still for specimens. The chapter concludes with the expected sections on catching, collecting equipment, preservation, mounting and labelling. The section on catching gives a warning that most countries require the holding of permits to catch and preserve flies (and other insects). Such permits can apparently take months and even years to be granted and even then they are often only issued to accredited scientists. These are legal requirements which have spilt over from legalisation primarily intended to protect vertebrates. I stand ready to be corrected, but I recall that this, or something similar, nearly happened in the UK. Such restrictions would surely result in a serious decline in entomological pursuits and we have a lot to be thankful for in many respects. The second and final chapter in the book covers identification and includes a set of ten keys to the world's fly families. The keys employ the common dichotomous approach, but in a graphical flowchart style with lines connecting boxes containing text and thumbnail diagrams. Page numbers are given in the final boxes for each family, referring to their entry in the photographic guides. Prior to the keys, a number of photographs of real flies are used to identify the main morphological attributes. This is, in my opinion, a far better approach than line drawings and should be used in all keys – especially those where genitalia are diagnostic. I tested the keys with a selection of various families and they do work; for me, the drawings were a little too small and some of the arrows that point to key parts were a bit hard to spot.

The book concludes with a short glossary, acknowledgements, references and an index. The references are split into chapters, the suitability of which is a matter of personal choice.

The photographs, all in full colour with no monochrome reproductions or line drawings (apart from the keys), form a major element of the book. All life stages are portrayed, including robber flies in action, a midge biting a crane fly and a mosquito biting a frog. There are no separate plates, although the photographic guide sections could be considered as such. Instead, the photographs are printed in with the text, sometimes with no background and surrounded by the text. The photographs are mostly very good to excellent; the several full-page photographs at 214mm (w) × 278mm (h) provide an idea of the quality achieved in many cases. Given the nature of the subjects and the difficulty in photographing representative species of the world's families, the photography cannot really be faulted. The only possible downside was the ease with which they distracted me from reading the text.

There are several statements to the effect that the Nematocera are considered 'artificial assemblages rather than real branches of the tree of life', which makes them a false grouping. This is apparently a widely recognised situation, but the traditional grouping remains in use. One reason for this is the lack of agreement on a more realistic classification. Until this occurs, the traditional Brachycera/Nematocera split will remain, but once the taxonomic community come to an agreement, name changes will surely be on their way.

It's probably fair to say that Colyer and Hammond, with their 'Flies of the British Isles' (Colyer & Hammond, 1951), succeeded admirably in their intention to provide a general introduction to the British flies. This publication inspired many to turn their attention to the Diptera, leading perhaps to the inevitable question – is 'Flies: the Natural History and Diversity of Diptera' a successor?

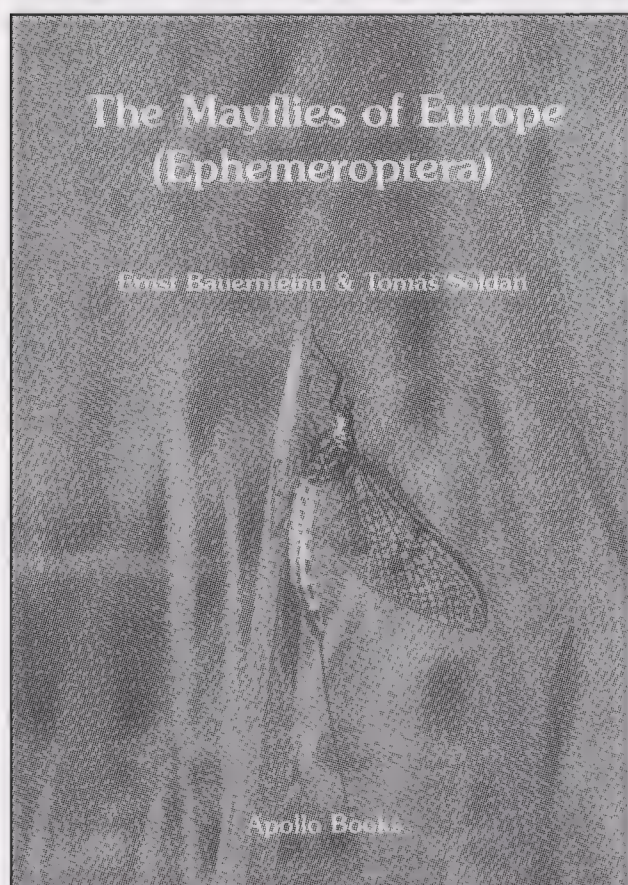
This is difficult to answer. Both books have a very similar layout. 'Flies of the British Isles' is some 60 years old, covers the then known British fly families, is far less concerned with taxonomical issues and its obvious narrower scope allowed for the inclusion of more detailed behavioural data. 'Flies: the Natural History and Diversity of Diptera' is up-to-date, covers the currently known world's fly families, considers taxonomic issues in far greater detail, but its wider scope limits the data on each family. Advances in technology have, however, enabled high quality photographs to take the place of drawings. All things considered, although some more behavioural data would be useful, in the absence of a British-oriented update I personally feel that this book is a suitable successor to Colyer and Hammond.

'Flies: the Natural History and Diversity of Diptera' provides a general introduction to the world's Diptera in an easy-to-read manner. It does not come across as being aimed at an academic audience, but this does not, however, mean that professional entomologists and academics would not find it useful. Established dipterists should find this book handy as a reference and an introduction to unfamiliar families. For specialists in other orders and budding entomologists in general, it provides an informative overview of the Diptera. Hoverflies have of course been replaced by flowerflies, but the coverage itself is worldwide, with no discernible regional bias. With its overview of the Diptera as a whole, this book should prove an asset and I anticipate it will be referred to during my own behavioural research.

JOLYON ALDERMAN

REFERENCE

Colyer, C. N. & Hammond, C. O. 1951. *Flies of the British Isles*. Frederick Warne & Co., Ltd.



The Mayflies of Europe (Ephemeroptera) by Ernst Bauernfeind & Tomáš Soldán. 781pp. (Apollo Books, 2012). Hardback £108.00 excl p&p. ISBN 978-87-88757-45-3.

Mayflies appear to be mainly of interest to professional entomologists, particularly those employed by the Environment Agency who use species presence and ranked abundance to monitor water quality of our lakes and rivers. There is also a small, but dedicated band of amateur enthusiasts who are interested in the distribution and biology of these species purely for their intrinsic beauty. Anglers in the UK have also been encouraged by the Riverfly Partnership to identify mayfly nymphs in order to measure water quality in their patch. Thus there are a number of seemingly disparate groups with an interest in mayflies. Identification has traditionally been considered difficult and

books on British mayflies have been few and brief (Elliott & Humpesch, 1983; Harker, 1989; Macadam & Bennett, 2010). Increasing concern about water quality and implementation of the European Water Framework Directive has led to an

increasing demand for more information about the taxonomy and ecology of mayflies. This book delivers.

The 'handbook' is designed as an up-to-date treatise on the identification of European mayflies, covering last instar larvae (nymphs), subimagos (duns) and male and female imagines (sexually mature adults). The checklist gives 369 species, with an additional one, *Rhithrogena sartorii* Zrelli & Boumaiza described from a holotype nymph in 2011 after the manuscript had been finalised. The sequence of families principally follows Hubbard (1990) and McCafferty (1991). Recent changes in nomenclature are discussed as well as gaps in our current knowledge and potential pitfalls in identifying 'difficult taxa' of which there are quite a few. Keys are provided for genera and introductory chapters characterize every family and genus. The authors encourage readers that 'with a little experience it is quite easy to identify *many* families of mayflies in all stages with the naked eye' 'but for the beginner it is frequently difficult to interpret characters correctly and great care has to be taken'. All keys are descriptive and make use of the eight diagrams illustrating general features of mayfly morphology described in the introductory chapter. Unfortunately this approach may be a little daunting to some, especially younger entomologists who have been brought up on user-friendly keys that include mini-diagrams with each couplet, that do away with the need to keep referring back to figures at the beginning of the book. The handbook would undoubtedly benefit by having more (better) illustrated keys that gradually build up readers' confidences.

The main section of the book, 462 pp, is devoted to species accounts. These follow a common format listing synonymy, characters for identification, remarks on type material (with loads of references), infraspecific variation, characters for separation from similar species and brief information on biology and distribution pattern. Male genitalia are illustrated by micrographs and line drawings, SEM photographs of the egg chorionic structure are provided for genera and selected species. Numerous colour photographs are included to illustrate the habitus of larvae and imagines. There is a lot to digest here – this section is a treasure trove of information for anyone interested in studying UK and mainland European mayflies.

This is followed by a comprehensive distributional catalogue based on Illies' Limnofauna Europaea (1968) which provides rapid access to information on all species recorded so far from Europe. Being mere islands somewhere off the coast of Europe we are listed under GB (Great Britain) and IRL (Ireland) or ecologically as 17 (Ireland and Northern Ireland) and 18 (Great Britain) – now you know.

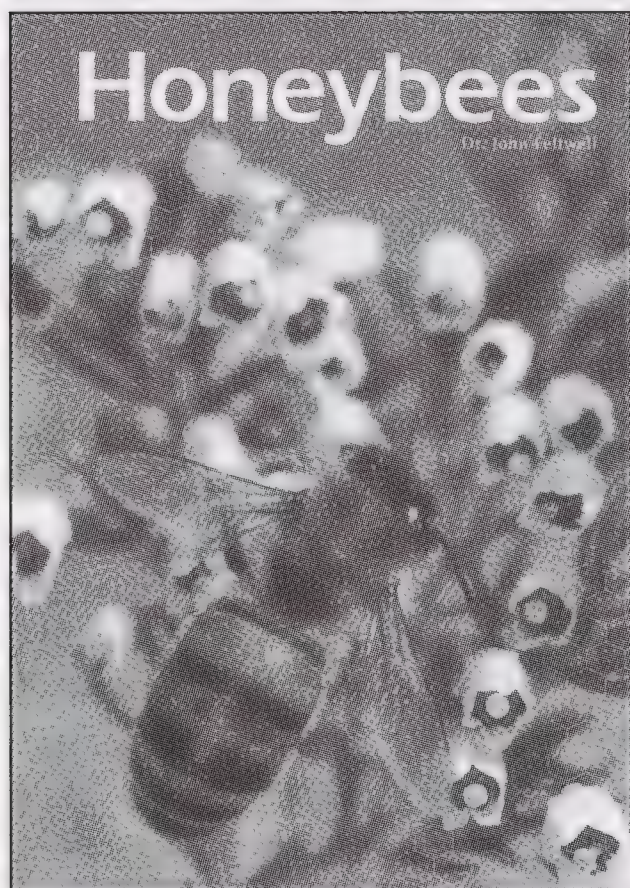
This is an important book on mayflies and a 'must have' for anyone interested in UK Ephemeroptera. It is described as a handbook, but weighing in at just over 2 kg it is not an easy tome to carry around, especially in the field. It is well produced and the authors and publisher are to be congratulated on a first class publication. Despite the wealth of information on mayfly biology that it contains this is a heavy read in places. Even so I hope the book encourages some entomologists to begin studying this fascinating group of insects. I cannot remember when a mayfly was last shown at the Society's annual exhibition – it must be nearly 20 years ago, and as for a paper on their distribution or biology in the Journal that must be last century. Very curious – they do fly to light after all.

JOHN BADMIN

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Honeybees by John Feltwell. Wildlife Matters, 2012. 60pp. Softback. £10.00. ISBN 978-0-907970-04-0.

This A5 glossy softback book is packed full of information about honeybees, a subject close to the author's heart as an entomologist and practising apiculturalist. The exact aim of the book is not explicitly explained but it is obviously designed at informing the general public about the importance of honeybees and to enthuse readers to take up bee keeping. A timely book, with even national papers decrying the decline of our insect pollinators and neonicotinoids blamed for chronically affecting bee behaviour and colony decline.

There are four sections or chapters: 'Honeybees up close', 'Honeybees in your garden', 'Humans and Honeybees' and 'Bees in trouble'. Each page is generously splashed with superb colour photographs

illustrating various aspects of honeybee biology. A full page spread of a honeybee worker in the first section is used for naming various parts of a bee's body and describing their function – for example, we learn that bees' wings attached to the thorax beat at 200–250 cycles a second (easy if you have the right muscle fibres). Honeybees collect nectar, pollen, propolis and water and their uses are described. The multitudinous duties of workers are listed: cleaning cells, feeding larvae, capping brood, attending to the queen, grooming fellow workers, ventilating the hive and foraging, to name but a few.

The section on 'Honeybees in your garden' is neatly laid out to show which flower species are best for bees foraging in spring, summer and autumn, each with a colour photo, with some good tips on which species to plant in your herbaceous border or as specimen trees to maximise bee visits to your garden. Mention is also made of wild flowers and a list of these is given at the end of the book (in very small type!).

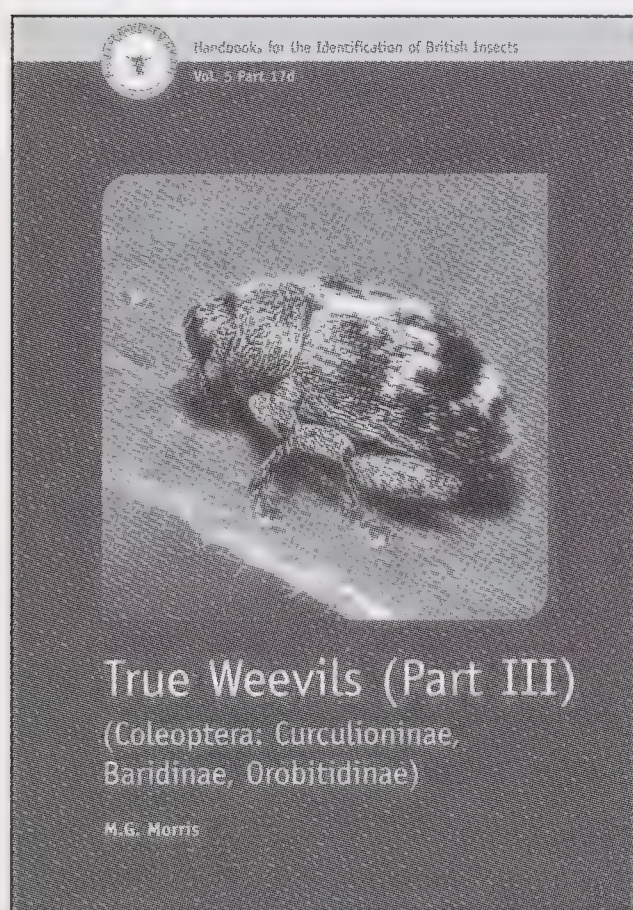
The main section 'Humans and honeybees' explains the basics of bee keeping, where best to place a hive, hive maintenance, extracting honey, swarming, the dangers of collecting wild bees and problems of pests and diseases. There are numerous tips on how best to keep bees and colour photographs showing necessary equipment and techniques for maintaining successful colonies.

The last section on 'Pests, diseases and predators' briefly lists the increasingly large number of natural enemies known to afflict honeybees in the UK today: mammals (mice, badgers); birds (woodpeckers); wasps and wax moths; the newly-arrived *Varroa* mite, vector of Deformed Wing Virus (dww) of honeybees; fungi and bacteria. Concern is also raised over the topsy-turvy reliance on monocultures, from top fruit to sunflowers, where there is a superabundance of nectar one moment to a dearth the next – seriously influencing brood survival.

The author concludes with some interesting facts and figures about honeybees: 3000 flowers visited by a worker honeybee per day; 25000 nectar flights to make 1kg of honey; 14, the average number of males a queen mates with.

This is a very informative, attractively laid-out book for anyone interested in honeybees and is highly recommended. With a bit of luck you can even spot the author working with his beehives in the dead of winter.

JOHN BADMIN



True weevils (Part III) (Coleoptera: Curculioninae, Baridinae, Orobittidinae) by M. G. Morris. Handbooks for the Identification of British Insects Volume 5, Part 17d. 136pp. Published for the Royal Entomological Society by FSC Publications, 2012. Softback £25.00. ISBN: 9780901546951.

Depending on your outlook on life, the weevils are either (half full) delightfully fun beetles, or (half empty) deceptively tricky. They're fun because they come in a variety of pretty shapes, sizes and bright colours. Many have friendly-looking patterns of coloured scales; some have chunky toothed legs, others have handsome shining carapaces. They're tricky because, with something like 40,000 species worldwide (about 480 in the UK), they are one of the most mind-numbingly diverse groups of organisms on the planet. Any novice faced with a small dark

Ceutorhynchus or a dull grey *Sitona* knows that feeling of being more than a little daunted.

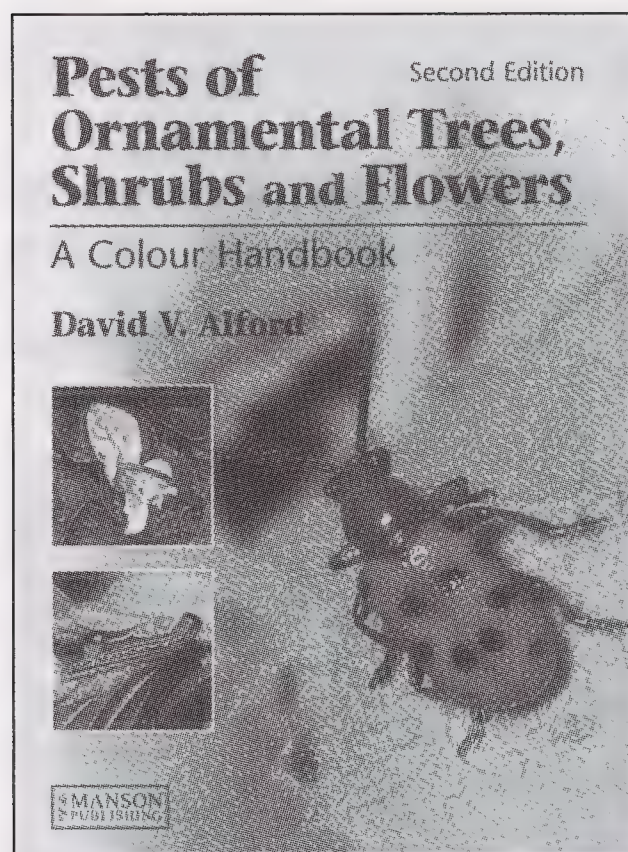
This, the final part of Mike Morris's true weevils handbooks, contains an unlikely hotchpotch of disparate groups. There are the charming and elegant shiners like *Baris* and *Orobittis*; the fluffy hopping *Orchestes*, and the bold sleek domed forms of *Curculio* and *Archarius*. But, then, here too are the deceptively bright *Anthonomus*, the obscurely stout *Miarus*, and the subtly demure *Tychius*. The fun and the tricky are both represented.

Mike knows his weevils, better than me, so it would be invidious to try and start picking apart his careful and authoritative keys. Maybe I can just whinge quietly that a few more pictures of these pretty insects in the coloured plates would not have gone amiss. Anyway, I'm glad to see that he is fairly accommodating to lazy setters like me, and most of his underside characters are visible from the side or in front.

The British weevils are now well served with Mike's excellent handbooks, and they ought to be a more popular group. I'm half-full, and I think they are delightfully fun critters. But you do have to watch out for the 'awkward' groups.

It is one of my standard rants that flies, difficult in all measures, do at least offer the taxonomically robust distinguishing characters afforded by individual bristles on individual legs. Given a single dolichopodid, it is usually possible to run it down. But a beetle So many distinctions are comparative – larger or smaller, broader or narrower, heavier or lighter punctured. It is no surprise, then, that in the very first key to genera, the very first couplet offers "Size small" or "Size large". It turns out that *Archarius* really is the lesser of two weevil genera.

RICHARD JONES



Pests of Ornamental Trees, Shrubs and Flowers. A Colour Handbook, second edition by David V. Alford. (Manson Publishing Ltd., 2012). 480 pp. 1148 colour illustrations. Hardcover £99.50. ISBN 978-1-84076-162-7.

This hugely popular book about pests of ornamental trees and shrubs cultivated in Britain and mainland Europe has been completely revised. Information is given on those species most commonly causing damage and those that, although of little or no economic importance, are often noticed by gardeners owing to their large size or striking colours. All groups are covered, though emphasis is given to insects and mites with brief coverage of miscellaneous pests such as woodlice, millipedes, symphylids, molluscs and nematodes. Birds and mammals are relegated to two pages at

the very end of the book, though just a moment's thought reminds one that pigeons, squirrels, mice, moles and rabbits are major offenders. Not to mention deer.

The book is arranged along taxonomic lines beginning with Collembola (e.g. the garden springtail *Bourletiella hortensis* (Fitch)), through Orthoptera (e.g. *Gryllotalpa gryllotalpa* (L.)), Dermaptera and Hemiptera and ending with Lepidoptera and Hymenoptera. The real strength of the book lies in its huge number of photographs, with nearly all genera and species figured in colour on their host plants, often showing the type of damage they cause. The book is right up-to-date with photos of Citrus planthopper *Metcalfa pruinosa* (Say), Wisteria scale *Eulecanium excrescens* (Ferris), Eucalyptus longhorn beetle *Phoracantha semipunctata* (F.), South American leaf miner *Liriomyza huidobrensis* (Blanchard) Box-tree pyralid *Cydalina perspectalis* (Walker) and Oak processionary moth *Thaumetopoea processionea* (L.), to name but a few.

For each species, descriptions are given of adults and larvae, their main area of distribution, life history details including hostplant range and type of damage. If you wish to know which species attack a particular host plant, for example ash, this can be found easily by searching the index for 'ash' or by specific species name – *Fraxinus excelsior* or *F. ornus*. Mites are treated a little differently by being grouped together according to hostplant genus e.g. *Acer*, with photos of galls rather than gall inducers.

This is a nice book to browse through and to identify those occasional pests that we encounter which might be damaging the appearance of our cherished garden plants. A significant proportion of the illustrated species may be described as tourists rather than major pests, but some can reach unacceptable levels and require a measure of control. Largely in response to modern views and industry's inclination towards integrated pest management, specific details of pest control measures have been omitted from this new edition. However some sensible general advice on how to control pests is given in the Introduction.

Unfortunately the book is very highly priced (for head gardeners and professionals only?) and I suggest the publishers consider printing a cheaper softback version which should reach a significantly wider market. It has the potential to be the leader in its field.

JOHN BADMIN

THE MAITLAND EMMET BENHS RESEARCH FUND

In 2001 the family of the late Lt. Col. Maitland Emmet, a distinguished amateur microlepidopterist, made a generous donation to the Society's Research Fund in his memory. As a result the Society has renamed its Research Fund the Maitland Emmet BENHS Research Fund. The Society is very grateful to the Emmet family for their generosity.

The Society invites applications for grants, from the Maitland Emmet Research Fund, to be awarded in January 2014. Awards are open to both members and non-members of the BENHS and will be made to support research on non-marine arthropods, with reference to the British fauna, and with preference given to insects, arachnids, myriapods and isopods. Grants will be given for:

- (a) the assistance of fieldwork on non-marine arthropods with relevance to their conservation,
- (b) work leading to the production of identification guides and distribution lists, but not the cost of publishing such items.

Travel to examine museum collections and to consult taxonomic specialists would be included. The work and travel is not limited to the British Isles but must have a demonstrable relevance to the British arthropod fauna. Individual grants are unlikely to exceed £500.

Preference will be given to work with a clear final objective (e.g., leading to publication or the production of a habitat management plan). Work on leaf miners and gall forming insects should be submitted to the Society's Professor Hering Memorial Research Fund.

Applicants should send seven copies, if possible, of their plan of work, the precise objectives, the amount for which an award is requested and a brief statement outlining their experience in this area of work, to **Ms. B. Garner, Department of Life Sciences, Entomology, Natural History Museum, London SW7 5BD**, as soon as possible and not later than 31 December 2013. Further information may be obtained from the same address (email: b.garner@nhm.ac.uk).

THE PROFESSOR HERING MEMORIAL RESEARCH FUND

The British Entomological & Natural History Society announces that awards may be made from this Fund for the promotion of entomological research with particular emphasis on:

- (a) leaf-miners
- (b) Diptera, particularly Tephritidae and Agromyzidae
- (c) Lepidoptera, particularly Microlepidoptera
- (d) general entomology

in the above order of preference having regard to the suitability of applicants and the plan of work proposed.

Awards may be made to assist travelling and other expenses necessary for fieldwork, for the study of collections, for attendance at conferences, or, exceptionally, for the costs of publication of finished work. In total they are unlikely to exceed £1000 in the year 2014.

Applicants should preferably email, or send six copies, of a statement of their qualifications, of their plan of work, and of the precise objectives and amount for which an award is sought, to **Dr E. McAlister, Department of Life Sciences, Entomology, Natural History Museum, London SW7 5BD** (email: e.mcalister@nhm.ac.uk). The closing date for projects in 2014 is 31 December 2013.



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Editor: J. S. Badmin, H.F.R.E.S, Coppice Place, Perry Wood, Selling, nr Faversham, Kent ME13 9RP (Tel: 01227 752291) email: jbadmin@btinternet.com

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The Society arranges a programme of talks on Saturdays at various locations in Great Britain and a joint evening lecture with the LNHS in London in September. In addition, workshop meetings are held at the Society's headquarters and the well-known ANNUAL EXHIBITION takes place in the autumn. The 2013 Exhibition will take place on Saturday 16th November at Kempton Raccourse, Sunbury-on-Thames, TW16 5AQ. Frequent Field Meetings are held at weekends in the summer. Visitors are welcome at all meetings. The current Programme Card can be obtained on application to the Society at its headquarters at Dinton Pastures or in downloadable form from the website www.benhs.org.uk.

The Society maintains a library and invertebrate collections at its headquarters in Dinton Pastures, which are open to members on various advertised days each month. The Society's web site, <http://www.benhs.org.uk>, has the latest news.

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Society Website: www.benhs.org.uk for recent information on the Society's meetings programme and general society details. The Society also has a Facebook page.

Cover photograph: The hoverfly *Eristalis crytarum* (F.) on Dartmoor. Photo: J. Walters.

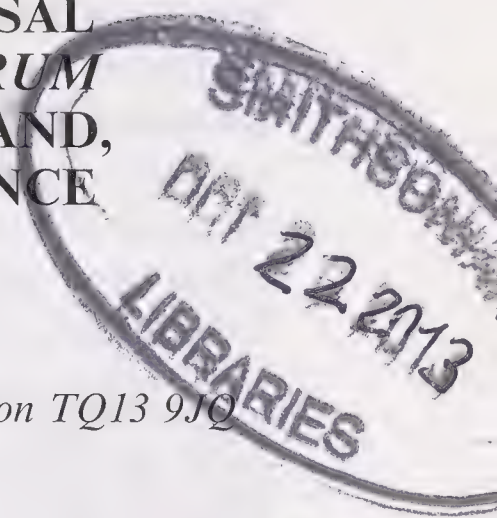
NOTE: The Editor invites submission of photographs for reproduction on the front covers of the journal. The subject matter is open, with an emphasis on aesthetic value rather than scientific novelty. Submissions should be in the form of colour or black and white digital images (jpg or tiff format) with a minimum resolution of 1275 pixels (i.e. 4.25 inches @ 300dpi).

PHENOLOGY, POPULATION SIZE AND DISPERSAL OF THE RARE HOVERFLY *ERISTALIS CRYPTARUM* (DIPTERA: SYRPHIDAE) ON DARTMOOR, ENGLAND, AND IMPLICATIONS FOR FUTURE SURVEILLANCE

C. M. DRAKE¹ & N. BALDOCK²

¹Orchid House, Burr ridge, Axminster, Devon EX13 7DF

²Dartmoor National Park Authority, Parke, Haytor Road, Bovey Tracey, Devon TQ13 9JQ



ABSTRACT

Adults of the rare hoverfly *Eristalis cryptarum* (F.) were monitored for five summers at several upland seepage sites on Dartmoor. The phenology showed a consistently pronounced peak in May, a less obvious peak in September, and with variable appearance in the mid summer months that could be interpreted as a distinct midsummer generation. Mark-recapture studies in May in two years at different sites suggested a maximum population of about 40 flies at one site and about 100 at the other, both estimates being far greater than suspected using transect counts. The maximum recorded distance moved by a marked fly was c. 500m. Residence time at a site was at least 18 days. Future surveillance and survey are best concentrated in May, with searches at each site lasting 40–60 minutes between 10.00h and 17.00h.

INTRODUCTION

The work described here contributes to the understanding the ecology of the hoverfly *Eristalis cryptarum* (F.) which was listed for action in the UK's Biodiversity Action Plan (UK Biodiversity Group, 1999). The fly has always been scarce, being known only in southern England where past populations were found mainly on the heaths of Dorset and the New Forest, and at scattered sites in Devon and Cornwall, with one unconfirmed record for Gloucestershire (Stubbs & Falk, 2002; Ball *et al.*, 2011). The last record was in 1978, which meant that the species met the criterion of substantial contraction in range in the 25 years leading up to publication of the UK BAP in 1999. It was given Vulnerable status in the UK Red Data Book (Shirt, 1987) and this has been changed to Critically Endangered in the updated hoverfly review (Ball & Morris, 2013).

In 1993, this attractive drone fly (see front cover) was rediscovered on Dartmoor and subsequently the Dartmoor National Park Authority instigated work on the BAP objectives of autoecological research, monitoring and surveys to determine the status of the species. The data presented here derive from studies between 1998 and 2004 funded by Dartmoor National Park Authority and English Nature (Ramel, 1998; Perrett, 2000; Drake & Baldock, 2002, 2003, 2004). The aims of these projects were ambitious and included attempting to elucidate the life history and understand the fly's habitat needs. Drake & Baldock (2005) give an overview of the work and the present paper gives greater detail of the work undertaken to estimate the flight period and population size on two sites where *E. cryptarum* was seen often. The species has still been recorded rarely by hoverfly recorders, but a survey undertaken after the present work confirmed its known range (Walters, 2008) and it has been recorded at new sites periodically in recent years.

The work was undertaken to provide a better understanding of the species distribution and status, and to learn more of its ecology and habitat requirements. This information would then be used to inform site management. All the sites where *E. cryptarum* has been seen lie within Dartmoor National Park and nearly all of them

are in private ownership and outside designated SSSIs. Habitat management is therefore largely determined by agri-environment agreements that are able to encourage extensive grazing of mires and seepages.

METHODS

Sites

Dartmoor is an upland area of igneous rocks, high rainfall and predominantly mire and moorland vegetation. The few records of *E. cryptarum* prior to this study were from the edges of the open moor and within series of *Molinia* and *Juncus* mires and pastures known as Rhos pasture systems, which run along the river valley bottoms. Much of the detailed work was undertaken in a few sites in the East and West Webburn catchments at Challacombe Farm, Pizwell and Smoothmoor. The Challacombe Farm site (SX6979, 320m OD) had a particularly diverse flora in a mosaic of discrete seepages and small patches of mire (principal NVC communities being M25 with M29 soakways), mostly sheltered by scrub of *Salix cinerea* L. and *S. aurita* L.; the site was bisected by a straggly hedge of these willows. The nectar sources *Caltha palustris* L. (marsh marigold) and *Menyanthes trifoliata* L. (bogbean) occupied almost non-overlapping patches here. The study site covered an area about 400m × 80m. For the purposes of estimating movement by the flies around the Challacombe Farm site, it was divided into seven blocks of unequal size using its vegetational and topographic features, and centred on a discrete patch of flowers visited by *E. cryptarum*, or well developed seepage that formed the key feature of each block. Pizwell (SX6678, 340m OD) was an exposed area of grazed moorland with nearby *Salix* scrub, dominated by a broad seepage occupying an area of about 300 × 50m. Smoothmoor (SX7277, 225m OD) was a single flat uninterrupted expanse of sheltered valley-floor mire about 150 × 50m dominated by *M. trifoliata* and *Carex nigra* (L.) Reichard. The mire was entirely surrounded by wet woodland, and there were no obvious alternative feeding sites for adult *E. cryptarum* in the immediate vicinity.

Surveillance

Eristalis cryptarum is readily identified in the field by its flight behaviour, dumpy shape, ginger tinge and conspicuous abdominal banding. It is very wary compared to common *Eristalis* so considerable vigilance was needed during searches. It was recorded during a slow walk with stops every few paces to search surrounding vegetation and flowers several metres ahead, sometimes with the aid of close-focus binoculars (Bushnell, 8 × 32). The results presented here use data collected over six years by three recorders using essentially the same method: Ramel (1998), Perrett (2000) and Drake (Drake & Baldock, 2002, 2003, 2004). The time spent at each site varied but visits by CMD lasted at least 25 minutes, and often much longer. A number of localities were visited but not all could be included in one day's work.

Mark-recapture

Mark-recapture of adults was undertaken at two sites where adults could be seen reliably as they were attracted to flowers of two of their preferred food plants, *C. palustris* and *M. trifoliata* (Drake, 2005). Smoothmoor was visited by up to three workers on six occasions between 30 May and 24 June 2003, after which none were seen here during regular surveillance for the rest of the year. Challacombe Farm was

visited by one worker nine times between 7 May and 26 June 2004, after which no more flies were seen until the end of August.

Flies were attracted to low-growing flowers and thus were relatively easy to sample. Smoothmoor was sampled by stalking the flies while randomly walking around the mire; Challacombe Farm was sampled by moving from one discrete patch of flowers to the next. The flies were caught using dark insect nets and, while gently holding the flies by their legs, marked using Staedtler Lumocolor waterproof fine-nibbed pens. The pale yellow bands on the second and third tergites provided backgrounds which could be marked in three positions (left, centre, right) to give 63 combinations. When these were exhausted, a mark on the orange tibiae allowed the patterns to be repeated. The wings were also marked crudely as a means of easily spotting marked individuals, although the abdominal and leg marks could not be seen using binoculars, so all flies had to be netted for close examination. Red, blue and green pen marks were equally easy to see, and showed no apparent deterioration with age. The time and the fly's sex and approximate position at Challacombe Farm in 2004 were recorded for each capture.

Their behaviour on release varied from lethargy, especially in cool weather, through indifference, for example they would often fly to the nearest flower and resume feeding, to considerable agitation when they would fly off rapidly. As flies may have flown away further than a normal flower-to-flower distance when released, in the second year's mark-recapture exercise, a fly's agitation was reduced by putting it into a large tube which was then pushed into a tussock, and the fly allowed to make its own way out.

Analysis

Methods for estimating population size from mark-recapture data make different assumptions about the behaviour of the animals. The main assumption for some methods is that there are no losses or gains to the population but active adult insects in semi-natural countryside are very unlikely to operate within closed populations. The Jolly-Seber method makes no assumptions about losses and gains, so is appropriate to the *E. cryptarum* data. This method estimates the rate of loss and recruitment to the population but because errors in each of these estimates are compounded, the error in the population estimate can become quite large. However, this is considered preferable to the alternative of using more precise methods devised for closed populations, such as the Lincoln index, which would lead to possibly widely inaccurate estimates. Southwood & Henderson (2000) describe the Jolly-Seber method as the 'most useful' although it is not clear whether the present study meets the requirements for meaningful population estimates. A second method, Bailey's triple method, is applicable to open populations but the theoretical basis of its calculation differs markedly from that of Jolly-Seber. It was applied to the *E. cryptarum* data to provide confirmation that the results were in broad agreement. Although it was a safe approach to use a method that makes no assumptions about whether the population was open or closed, it may be admissible to assume losses and gains are negligible over a period that is very short compared to the adults' life span. The method of Craig, which applies to closed populations, was therefore used to estimate population size using recaptures on the same day or the first and second days only, using the procedures in Greenwood & Robinson (2006). Equations used in the calculations of Craig and Bailey's methods are given in the Appendix. The Jolly-Seber method was applied using the procedures give in Southwood & Henderson (2000) and Greenwood & Robinson (2006).

RESULTS

Surveillance

Eristalis cryptarum was rarely recorded at most sites. During 1999, 2000, 2002 and 2003 most sightings were sporadic except at Challacombe Farm and Pizwell. For instance, considerable time was spent searching Lizwell Mead in 2002 and 2003 without seeing any *E. cryptarum* between their first and final appearances in April 2002 and September 2003; this site is less than 2km down the valley from Challacombe Farm and less than 3km from Pizwell.

The time taken before flies were seen varied widely. At the most prolific site, Challacombe Farm, the time that elapsed before the first individual was seen in all visits in 2002 gave an estimate of the effort needed to establish that the fly was present before giving up the search (Fig. 1). This showed that the first fly was seen within 20 minutes on half of the visits, within 40 minutes in about two-thirds of visits, and within an hour in 90% of visits. An hour therefore represented the maximum time that was worth spending in a search.

Phenology

The combined records of the three observers for the six years showed a long flight period between 24 April and 29 September (Fig. 2). There was considerable year-to-year inconsistency in possible cohorts. In the first and last years (1998, 2004) no flies were recorded through the midsummer period and there were only rare summer sightings in 2003. In contrast, the remaining years (1999, 2000, 2002) showed midsummer months to be the most productive although the May peak was probably missed in 1999 due to recording starting late. The feature common to all years was a definite spring emergence and a less well defined September peak.

As the records alone do not provide convincing evidence for discrete cohorts, the results were re-plotted using the numbers of flies recorded at each site. The numbers of flies seen during surveillance was not noted by Ramel (1998) or Perrett (2000) in one of the two years of his study. However, numbers seen were always low, with a maximum of 11 flies on one occasion, but almost all other searches revealed only one or two individuals. A parsimonious value of 2 was therefore felt justified to represent

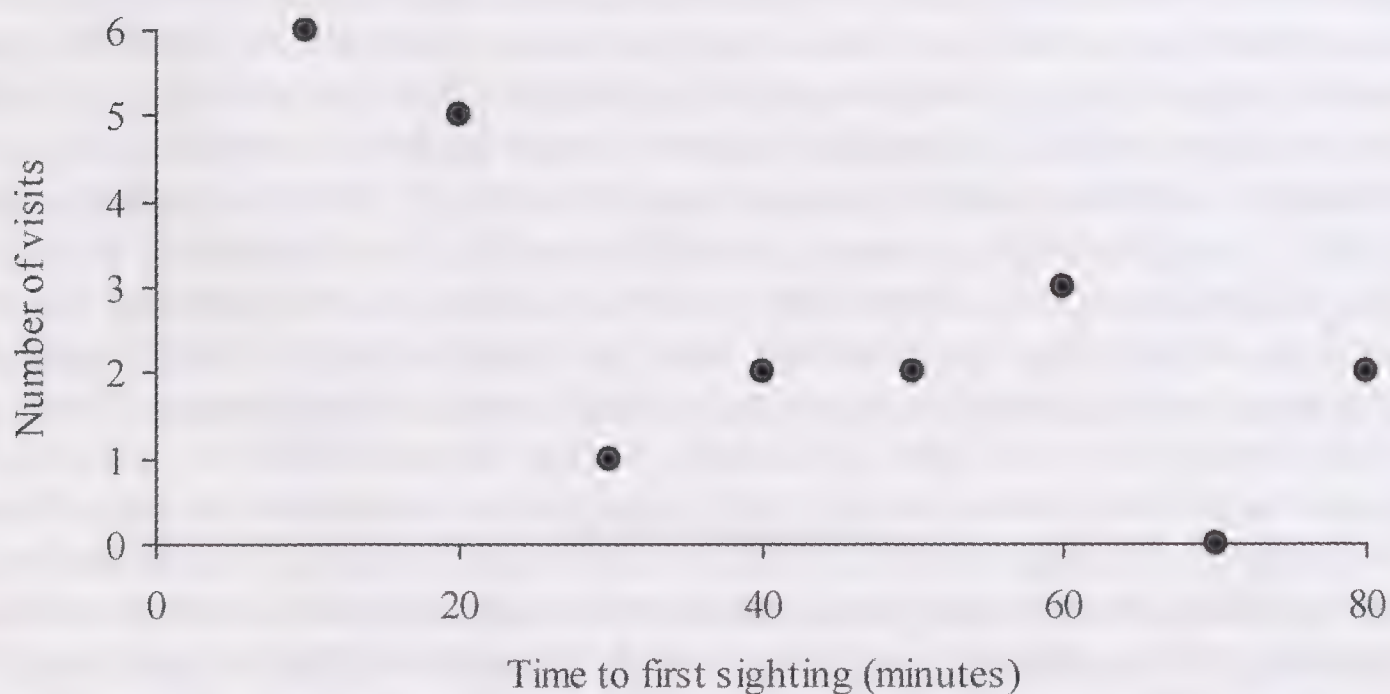


Fig. 1. Time elapsed before the first *Eristalis cryptarum* was seen on 21 visits to Challacombe Farm in 2002.

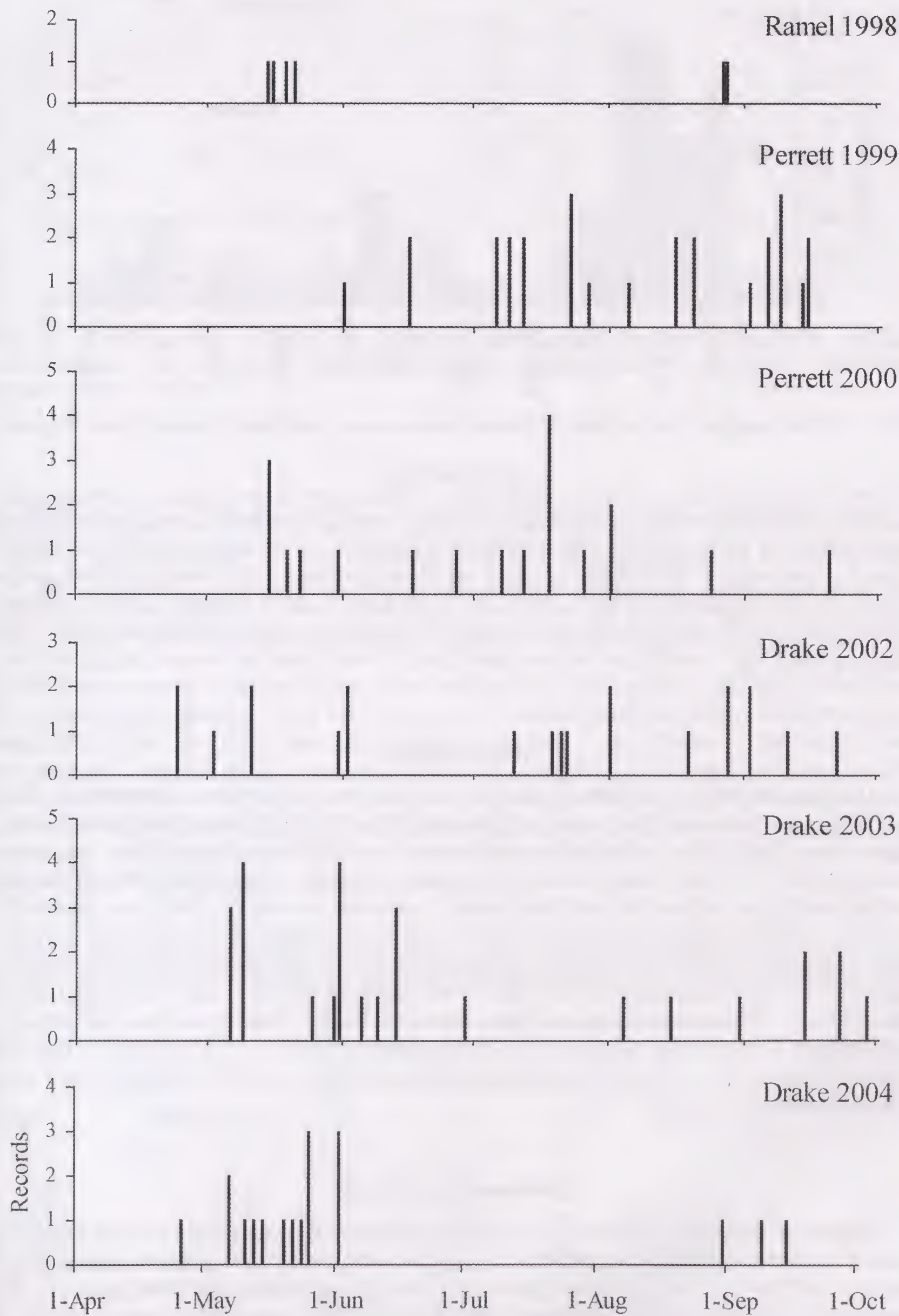


Fig. 2. Records by each named observer in each year from 1998 to 2004. This gives presence of *Eristalis cryptarum* at different sites visited on one date, not the abundance of flies.

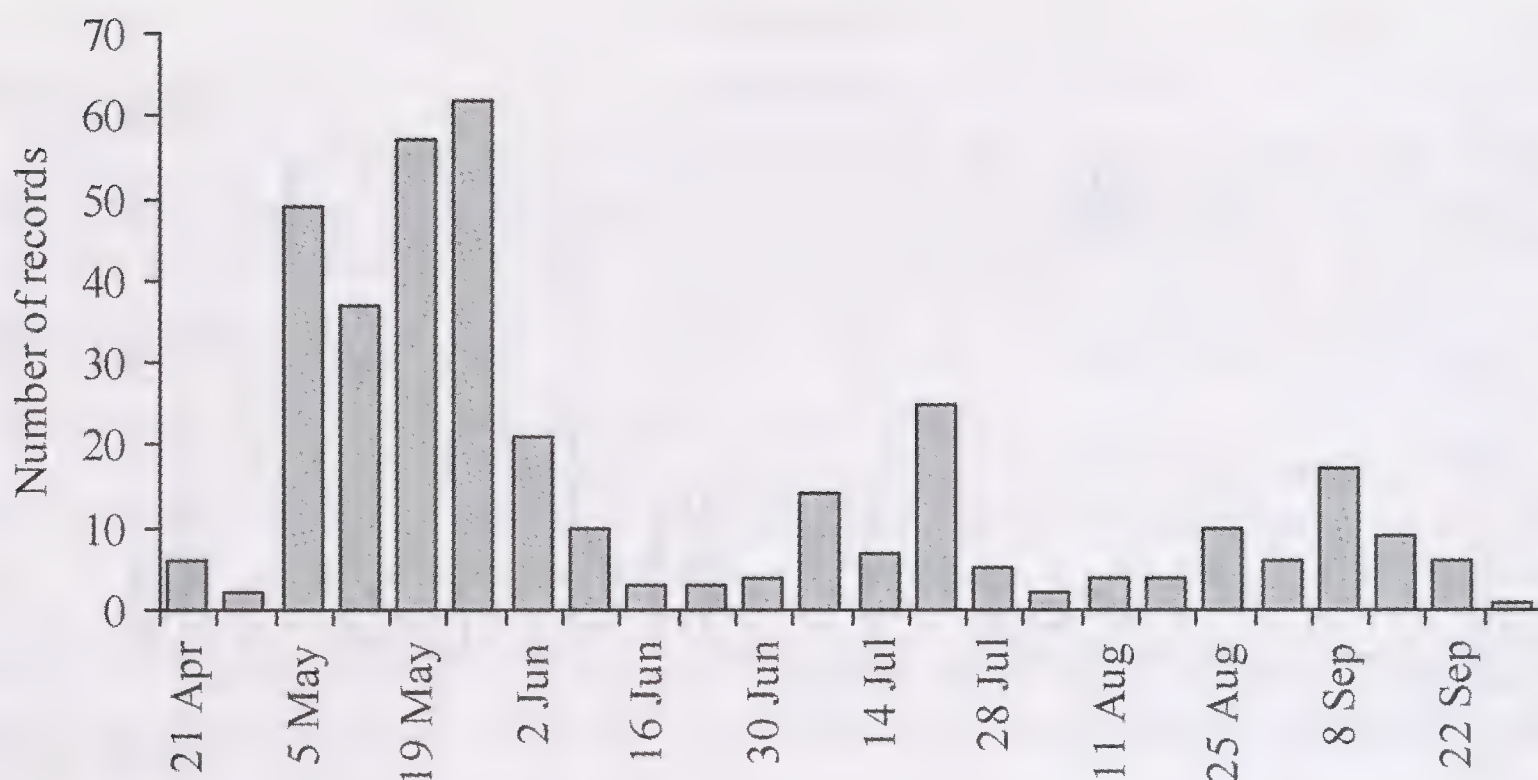


Fig. 3. Total number of individuals of *Eristalis cryptarum* in each week summed over six years.

Ramel's 'several' flies, and 1 for all Perrett's 2000 observations. Large numbers seen during the two mark-recapture studies in May 2003 and 2004 also biased the results but there was no pragmatic way of removing these without approximating them to some smaller value. With these caveats, the number of records per calendar week for the six years' observations showed a very large May peak, a smaller one in mid July and another in early September, and clear troughs throughout most of June and August (Fig. 3).

Mark-recapture

At Smoothmoor 45 individuals were marked during the first five visits over 14 days in 2003. By the end of the sixth visit on the 26th day, 98 sightings had been made. Over half (28) of the individuals were marked on the first day by three recorders working for 21 man-hours during hot sunny weather. Less effort was spent on subsequent days when the weather (apart from on the second day) was generally rather cool and often not sunny; only 2–6 flies were marked on these later visits. At Challacombe Farm, 109 flies were marked and 165 sightings made altogether on nine visits over 26 days in 2004; the last fly was seen on the 26th day. The daily rate of re-sightings of flies marked on previous days (as distinct from the more frequent recaptures of flies marked the same day) varied widely from 6 to 53% (zero on the last day). Twenty-eight of the 45 Smoothmoor flies and 76 of the 109 Challacombe Farm flies were not seen again.

Residence time on site

Residence time was estimated by plotting the time that elapsed between marking and the final re-sighting, regardless of the date when a fly was marked, against the number of flies surviving this length of time, and extrapolating the fitted curve to the time axis. Numbers were transformed using $\log + 1$. The regressions were significant at $P < 0.05$ for all flies at both sites and for males alone at Challacombe Farm. Residence time at Smoothmoor was 18.4 days, and at Challacombe it was 18.9 days for all flies and 12.8 days for males alone (Fig. 4).

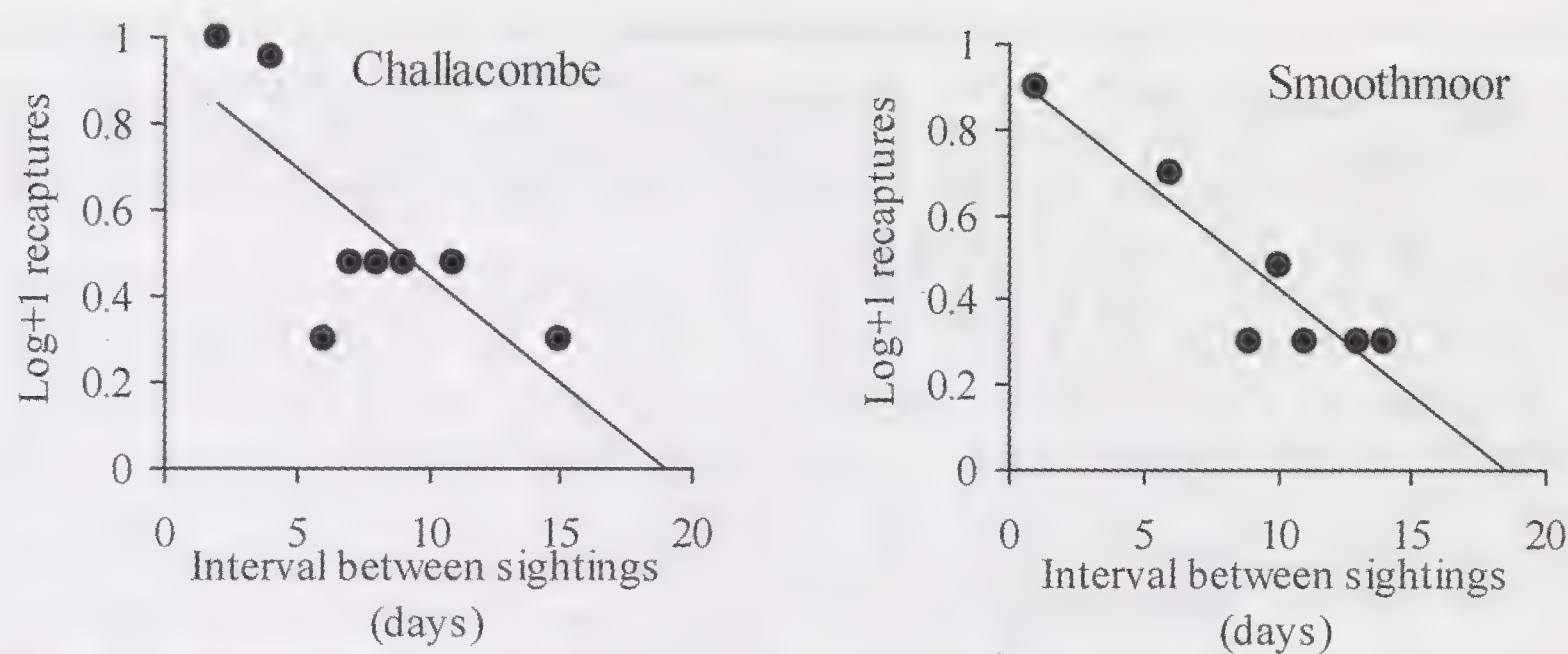


Fig. 4. Residence time indicated by the log + 1 transformed number of *Eristalis cryptarum* adults against the maximum time interval between sighting at Smoothmoor in 2003 and Challacombe in 2004.

Population size

The data from Challacombe Farm on the earlier days of the mark-recapture study could be fitted to models for a closed population with only a small possible error when the three basic tests were applied. The χ^2 -test for whether the numbers of flies caught varied between occasions was only just non-significant ($\chi^2=17.48$, 8df, $P>0.05$) and the Spearman rank correlation coefficient between the date of visits and the proportion of marked flies on each date was not significant ($r_s=0.273$, $N=9$, NS). These results indicated that there was only a small consistent loss of marked flies over short periods. The test for fit to a zero-truncated Poisson distribution suggested that the data may fit models for closed populations. However, the recaptures formed a small proportion of marked animals so these results were only just acceptable for the better returns on early days. With this proviso, population estimates using Craig’s method for closed populations varied between 21 and 76 flies after the initial low estimate on the first day which was probably close to the beginning of the emergence period (Table 1).

Table 1. Population estimates (P) of *Eristalis cryptarum* with 95% confidence limits (CL) at Challacombe Farm in 2004 using the methods of Craig, Jolly-Seber and Bailey (with standard error only).

Date	Day number	Craig		Jolly-Seber		Bailey	
		P	CL	P	CL	P	SE
7 May	0	12	9–15				
11 May	4	29	21–37	19	11–78		
13 May	6	21	13–29	127	39–818		
15 May	8	57	21–93	226	70–1514		
20 May	13	76	56–96	164	68–747		
22 May	15	21	5–37	52	28–155		
24 May	17	62	0–173	90	25–954	45	44
26 May	19	41	7–75	13			
2 June	23			0			

Estimates using the Jolly-Seber method were large and had very wide confidence limits (Table 1). The data failed the χ^2 goodness-of-fit test although this was predictable given the low re-capture rates which dwindled to zero on the last three occasions. The population estimates therefore gave only a crude indication of the possible numbers of *E. cryptarum* at the site.

Bailey’s triple capture method could be calculated for only one set of successive visits since it depended upon there being no zeros in any of the combinations of capture-recapture. The estimated population on 24 May was 45 (SE = 44) flies.

The data for Smoothmoor were too sparse for detailed analysis. Craig’s method was applied to the consecutive first two days when most flies were marked (35 of the 45 flies captured), treating the two days as a single period. The data did not fit a zero-truncated Poisson distribution ($G=5.63$ with 1 d.f., NS) so the population was probably not closed. The approximate population estimate was 45 ± 10 (95% confidence limits) flies.

Distances moved

Each capture at Challacombe Farm was allocated to one of the seven blocks into which the site had been divided, and the flight distances between these blocks were categorised as short (less than 50m, and nearly all of these were less than 20m within or between adjacent blocks), medium (50–100m) or long (>100m).

Most individuals flew only short distances within any day and some appeared to stay in the same block for long periods (Table 2). Five flies moved no more than about 100m in 8–15 days, and some that were recaptured at least twice were found as close to their original capture point after a long period as after two days. They appeared, therefore, to be moving around the site moderately quickly but perhaps not leaving it. Only three ‘long’ flights were recorded, two of these being between extremities of the main site (which was 250m long). The longest distance recorded was 500m (over 8 days) to a small mineral-based seepage well downhill of the main site, where *Caltha* grew profusely. Only unmarked flies were seen at two neighbouring farms 800–1100m from the main site where suitable habitat was searched during the peak of the study when many flies had been marked. This is not surprising given the large effort needed to find flies even at Challacombe Farm which had one of the richest concentrations of *E. cryptarum*’s preferred food plants in the area.

Table 2. Number of individuals of *Eristalis cryptarum* moving different distances in each time interval at Challacombe Farm in 2004.

Distance	Time interval (days)									Total flies
	Same day	2	4	6	7	8	9	11	15	
Short (< 50m)	23	6	5	1	2		1		1	39
Medium (50–100m)	5	3	1	1		1	1	1		13
Long (> 100m)			2			1				3
Total	28	9	8	2	2	2	2	1	1	55

Diurnal behaviour

Changes in abundance of flies throughout a day were estimated using the combined data from the two mark-recapture studies. The average number seen per half-hour was calculated to correct for differing periods of observation and for the different numbers of observers in the Smoothmoor study. During three year's surveillance (2002–2004), the earliest fly seen was at 9.55h, and the latest was at 17.35h (British Summer Time which is about 1.25 hours later than solar time at Dartmoor). These results were mirrored in the mark-recapture results (Fig. 5). Activity had scarcely begun until shortly before 10.00h, when it picked up quickly, and stopped by 17.30h. Different patterns of daily abundance were found at the two sites, with a morning peak at Smoothmoor but no pronounced peak at Challacombe. There was no difference between the sexes in their daily activity.

Eristalis cryptarum visited mainly *Caltha* and *Menyanthes* in spring. The number of flies visiting each plant at Challacombe Farm showed separate peaks of abundance, with *Caltha* being preferred at the start, then later visits concentrating on *Menyanthes* (Fig. 6). This pattern almost certainly matched the pattern of flowering of each plant although no counts of each plant were made to confirm this.

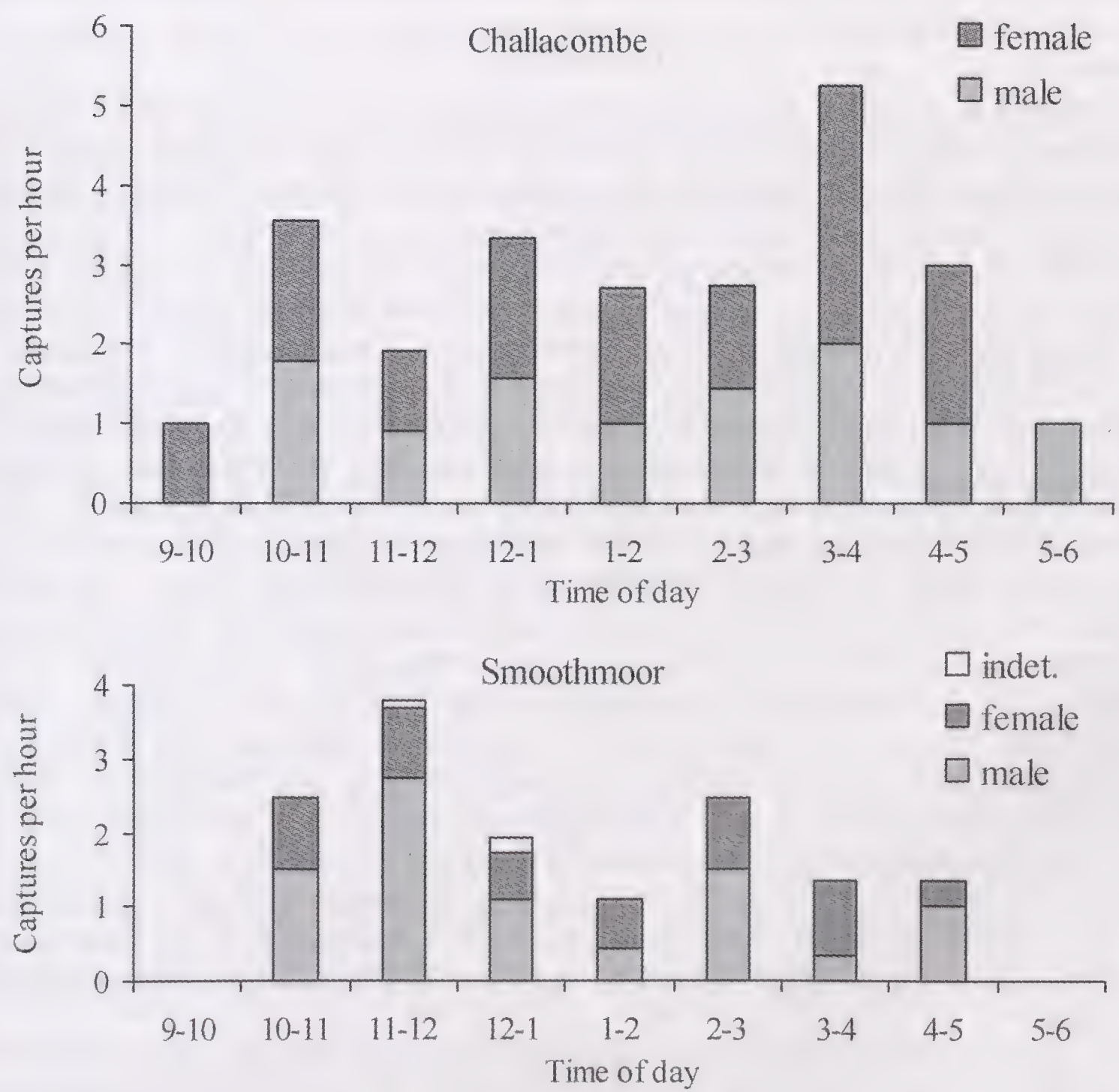


Fig. 5. Average captures of *Eristalis cryptarum* throughout the day for all dates at Challacombe Farm and Smoothmoor during capture-recapture studies.

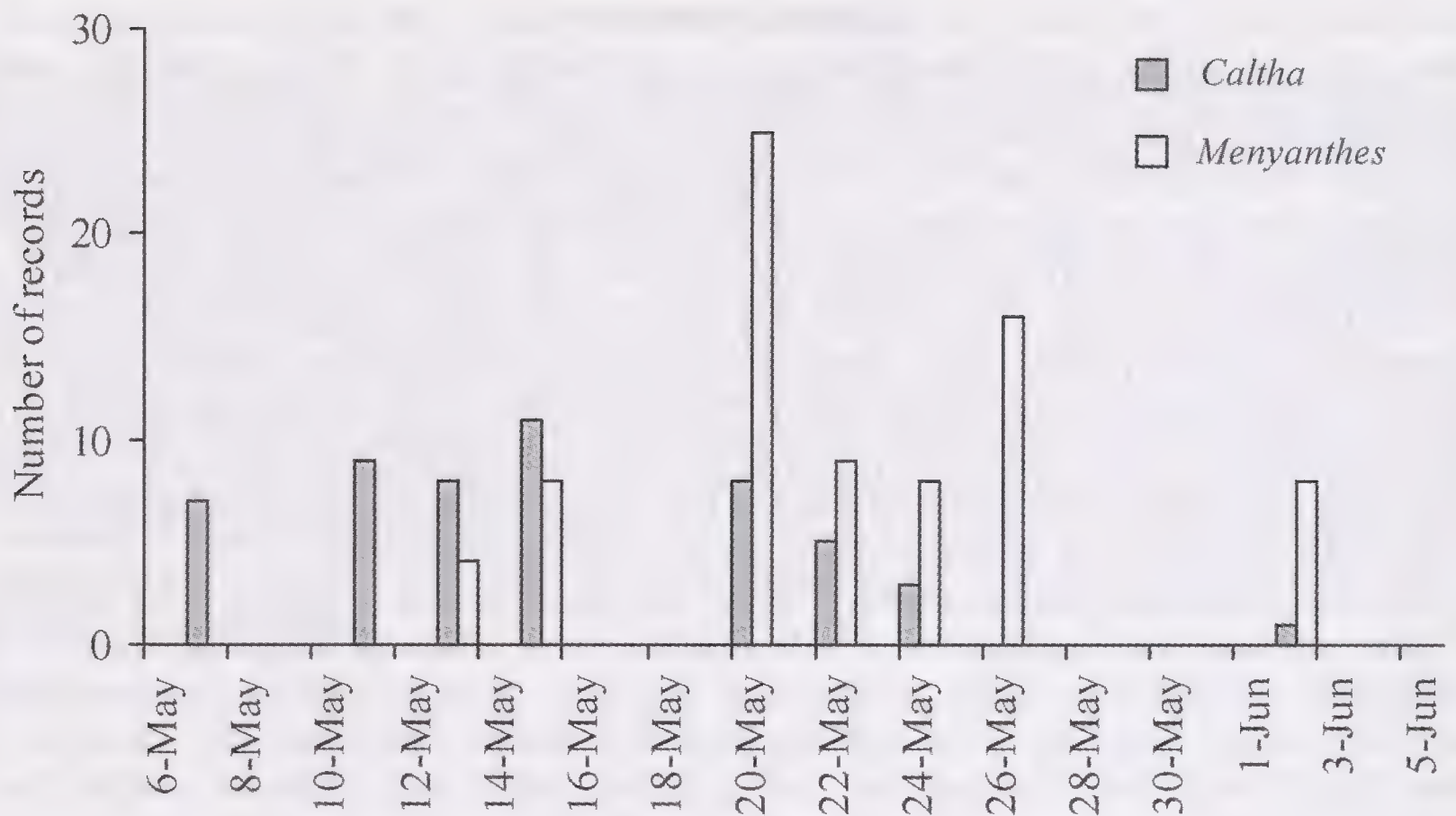


Fig. 6. Number of records of *Eristalis cryptarum* visiting *Caltha* or *Menyanthes* at Challacombe Farm during the mark-recapture study in 2004.

DISCUSSION

Surveillance and mark-recapture studies confirmed the rare status of *E. cryptarum* in Dartmoor. They illustrated a fly living at very low densities, with rather unpredictable phenology, fickle in daily appearance and probably moving only short distances on a regular basis but doing so perhaps quite quickly. They also showed the adults to have clear flower-feeding preferences and strong links to seepage habitat although the larvae have not yet been found (Drake & Baldock, 2005; Drake, 2005, 2008). Rare species are difficult to study (Thompson, 2004) and *E. cryptarum* was typical of this class of animal so the present results represent a small achievement.

After six years of surveillance, it is still not possible to be sure of the number of generations but it is almost certain to be at least two (Fig. 3). A pronounced peak in May, with both a marked rise and then fall in numbers, suggested that the species overwinters as a larva, in common with the suggested life cycle of many *Eristalis* other than *E. tenax* (L.) that hibernates as an adult (Hartley, 1961), and perhaps *E. pertinax* (Scopoli) (Owen, 1991). Synchronised emergence of the spring generation is probably induced by rising temperatures. Thereafter, reproduction may be continuous but decreasingly synchronised, and thus leading to the variable 'peaks' in different years. Rotheray & Gilbert (2011) suggest that eristaline hoverflies have no more than two generations per year and phenology histograms for species of *Eristalis* in Ball *et al.* (2011) show that only *E. intricarius* (L.) and *E. pertinax* having two clear peaks, whereas all others apart from *E. cryptarum* have one. Owen (1991) found that seasonality in only about a quarter of common hoverflies visiting a garden could have been inferred correctly in a three year period compared to patterns revealed over 15 years, so it is perhaps not surprising that the phenology of a rare species is still unclear.

There appear to be remarkably few attempts to measure the population size of flies unless they are pests. Knowing the population size of rare species is important in conservation management for several reasons. Among these are gaining a better

understanding of the rarity status and the robustness of the population from which the likelihood of its decline can be inferred. These in turn influence the priority given to a species, especially when financial aid is involved. The population at Challacombe Farm was in the order of tens of flies over the 26 days of the study, reaching a peak in mid May of about 80 or a little over 200 flies, depending on the chosen method of analysis (Table 1). Confidence limits of these values were very wide so precise values are not worth quoting. However, all three methods used gave results that were not wildly different: the Jolly-Seber and Craig estimates were mostly within 1.5 and 4 times of each other (one was six times greater). It is therefore likely that the order of magnitude was correct, and that the population was therefore rather small for a fly. A more precise estimate cannot be expected owing to the low numbers marked and small proportion re-captured. The extent of movement into and out of the study area is also uncertain, but the very low numbers seen and low re-capture rates, even on the same day, suggest that many individuals remain for only short periods at one patch of food source.

These estimates seem unrealistically high compared to the tiny numbers seen in transect counts and during casual searches that usually amounted to only one or two individuals in many hours work per day. However, in support of the estimates being approximately correct is the very low rate of recapture of marked flies, which was zero for the last few visits. That implied that the population was far from closed and that flies probably had large ranges but were attracted to the study sites because of the unusually prolific food source here. What the project measured may have been the population visiting the flowers rather than what was living in the catchment of these mire. Trying to extrapolate these figures to a density measure, as Nielsen (1969) did for the hoverflies *Helophilus hybridus* Loew and *Sericomysia silentis* (Harris), and Holloway & McCaffery (1990) for *E. pertinax*, is unhelpful. A more useful maximum estimate of the number of *E. cryptarum* on Dartmoor would be obtained by the number of patches of similarly flower-rich Rhos pasture multiplied by the average population size at Challacombe Farm.

The main problem contributing to poor estimates was the low re-capture rate. However, this was not dissimilar to those found in several other studies of flies. Ball & Morris (2003) investigated three species of *Volucella* hoverflies in an English woodland. They marked and recaptured many more individuals of two of the species, although their rate of re-sighting was similar to that achieved with *E. cryptarum*. Their population estimates had very large confidence limits using the Jolly-Dickson index. In a study of the narcissus bulb hoverfly *Merodon equestris* (F.), Conn (1976) recorded large standard errors for population estimates, although in three of the four years of the work he marked smaller numbers of flies than were marked in the *E. cryptarum* study. Holloway & McCaffery (1990) studied a population of *Eristalis pertinax* but, after noting the very large loss of flies soon after marking them (about 5% were re-sighted the following day), they decided that the data were inadequate for estimating population size. A study of the asilid *Asilus crabroniformis* L. by Holloway *et al.* (2003) gave relatively small errors with 257 flies being marked, but their re-capture rate was remarkably high at close to 50%. The conclusion from these studies is that fast moving active hoverflies are not ideal subjects for estimating population size without considerably increased effort that covers the whole range of the diverse daily activities undertaken by hoverflies.

Residence time was similar at Smoothmoor and Challacombe Farm. They were higher than several estimates of 'longevity' of other large hoverflies but similar to the maximum interval between the first and last sighting of a marked individual (Table 3). These estimates are almost certainly not true life-times but just residence times at

Table 3. Average residence time or longevity (days), maximum interval between mark and re-capture and daily survival rate for some hoverflies.

Species	Notes	Residence time	Maximum interval	Daily survival	Source
<i>Eristalis cryptarum</i> (F.)	Challacombe all flies	18.4	15		this study
	Challacombe males	12.8	11		
	Smoothmoor	18.8	14		
<i>Eristalis pertinax</i> (Scopoli)	male	4.2	17	0.763	Holloway & McCaffery (1990)
	female		16		
<i>Merodon equestris</i> (F.)		11–17			Hodson (1932)
		3–11			Conn (1976)
<i>Helophilus hybridus</i> Loew		3.4	14		Nielsen (1969)
<i>Sericomymia silentis</i> (Harris)		10.1	19		
<i>Volucella bombylans</i> (L.)				0.714	Ball & Morris (2003)
<i>Volucella inflata</i> (F.)			24	0.853	
<i>Volucella pellucens</i> (L.)			24	0.765	

the sites, since they were derived from mark-recapture data that cannot give any information on the many flies that leave the site or the age of flies when first marked. They are therefore the average minimum time that the flies would be expected to live. Rotheray & Gilbert (2011) quote genuine lifetimes of 49 and 51 days for male and female *Hammerschmidtia ferruginea* (Fallén) (Syrphidae) although they do not say how the data were obtained (presumably by rearing larvae and keeping adults alive).

Large hoverflies are powerful fliers capable of moving large distances quickly. Clearly, an accurate minimum of this distance can be assumed for migrating individuals arriving from continental Europe, but quantifying it in a fly’s normal day-to-day life is more difficult. Most *E. cryptarum* were recaptured within 50m of their previous position, and few were recorded more than 100m away, even after several days (Table 2). A complication in interpreting these data is that the flies were attracted to the site to feed but may have moved away between feeding periods. In their study of *E. pertinax*, Holloway & McCaffery (1990) found that the flies moved only slowly from one area of creeping thistle *Cirsium arvense* (L.) Scop to the next within a large glade dissected by worn footpaths (on a university campus), so small local movements may be normal over short periods. The smaller hoverfly *Episyrphus balteatus* (Degeer) was found to move at least 200m along arable field margins away from a dense flower source (*Phacelia*) over a period of 7 days but most individuals moved much shorter distances (Wratten *et al.*, 2003). In contrast were very small dispersals of just a few metres made by the highly specialised ant parasite *Microdon mutabilis* (L.) which may need to remain close to the very patchy parasite resource (Schönrogge *et al.*, 2006), and far longer distance of at least 4km recorded for *H. ferruginea* (Rotheray & Gilbert, 2011). The longer distances moved are of greater interest since this determines their ability to find new flower sources or breeding sites. The greatest distance moved by an individual at Challacombe Farm was 500m,

which seems to be a small distance for a powerful fly. This result is very likely explained by distant patches being inspected on few occasions compared to the effort spent on the core area. The maximum dispersal distance of the damselfly *Coenagrion mercuriale* (Charpentier) was shown to be strongly dependent on the number of re-captures, and the median dispersal distance was dependent upon the duration of the study (Hassell & Thompson, 2012), so all these studies on hoverflies where considerably fewer individuals were re-captured than in the damselfly study will have probably under-estimated the maximum distance recorded.

Guidance for surveillance was derived from the study. *Eristalis cryptarum* has a very low density so it is unrealistic to expect that recording abundance is a useful exercise. During the mark-recapture study at Challacombe Farm, the number seen varied from hour to hour, sometimes markedly, and bore only an approximate relationship to the total number of flies seen by the end of the day. A slow-walk transect should therefore aim to record just presence since the number seen in a one-hour visit may not be a reliable guide to the strength of the local population. The conclusions derived from Dartmoor population are likely to be true for other sites. It is therefore feasible to attempt surveys of past *E. cryptarum* sites with a fair degree of confidence in assessing whether the species has really become extinct or is still present at very low densities. The following recommendations are suggested for surveillance and survey.

- Searches are most productive when the two preferred spring foodplants, *Caltha* and *Menyanthes*, are targeted, or *Succisa pratensis* Moench (devil's-bit scabious) in September (Drake, 2005).
- The greatest concentration of individuals was found in the second half of May when the emergence of this cohort appeared to be synchronised. Searches later in summer run the risk of coinciding with more protracted emergence and fewer individuals at each visit.
- Sunshine is important. The most reliable sightings were obtained between 10.00h and 14.00h before cloud led to continuously cloudy conditions although, when the sun was out for about half the time, the flies were flying until late afternoon. Air temperature did not appear to be critical: flies were seen feeding in sunshine when the air temperature was as low as 11°C, although more were seen when it was warmer.
- One hour was found to be the maximum time that was worth spending in a search at the most productive site but this recommendation may be less reliable for sites with very low densities. If several sites are to be visited on more than one occasion, this could be reduced to 40 minutes with a small loss of certainty of recording that *E. cryptarum* is present.

ACKNOWLEDGEMENTS

This work was funded by the Dartmoor National Park and English Nature. John Walters helped with the mark-recapture study at Smoothmoor and contributed additional records and observations. The land-owners have given ungrudging permission for the work, and Min Cullum and Andrew Kingsmill enthusiastically supported it.

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APPENDIX 1. EQUATIONS USED IN MARK-RECAPTURE ANALYSIS

Craig population estimates were made using the equation:

$$P = (\sum x f_w)^2 / (\sum x^2 f_w) - (\sum x f_w)$$

where P = population estimate, f_w = frequency with which individuals marked x times have been caught (Southwood & Henderson, 2000). Following the iterative procedure in Greenwood & Robinson (2006), this first estimate was refined and confidence limits applied to the refined value using the formula:

$$2(P / (\exp(\sum x f_w / P) - \sum x f_w / P - 1))$$

Bailey’s triple capture method estimates the population on the second of three successive visits. The population using Bailey’s correction factor for small populations is:

$$P_2 = (a_2 (n_2 + 1) r_{31}) / (r_{21} \times r_{32})$$

with approximate variance:

$$s_2^2 = P_2 - (a_2^2 (n_2 + 1)(n_2 + 2)(r_{31} - 1)r_{31}) / ((r_{21} + 1)(r_{21} + 2)(r_{32} + 1)(r_{32} + 2))$$

where a_2 is the number of flies marked on the second visit, n_2 is the total number of flies captured on the second visit, r is the number of recaptures on the visit indicated by the first subscript and which were marked on the visit indicated by the second subscript (Southwood & Henderson, 2000).

SHORT COMMUNICATION

An atlas of the British Hemiptera-Heteroptera from the county records of Massee (1955). – The study of the national distribution of the British Hemiptera-Heteroptera began with Butler (1923), which divided the British Isles into 54 geographical regions (the 52 English and Welsh administrative counties, Scotland and Ireland), and cross-tabulated these with 491 species and varieties, showing their presence or absence for each region. This work was extended by Bedwell (1945) and then by Massee (1955), both authors adopting the same 54 regions, and increasing the number of forms to 511 and 522, respectively. In spite of much subsequent effort by recorders, for most of the British list Massee (1955) is the most recently published study of the national distribution of the British true bugs. This often cited and historically important work has only ever existed as a cross-tabulation, from which the geographical forms of the distributions are not easy to visualise, and the lists of species for the regions are cumbersome to derive. For the first time, Massee's county records have now been compiled as an atlas, comprising a set of distribution maps, one for each species, and a set of species lists, one for each of the geographical regions. An example distribution map is shown in Fig. 1.

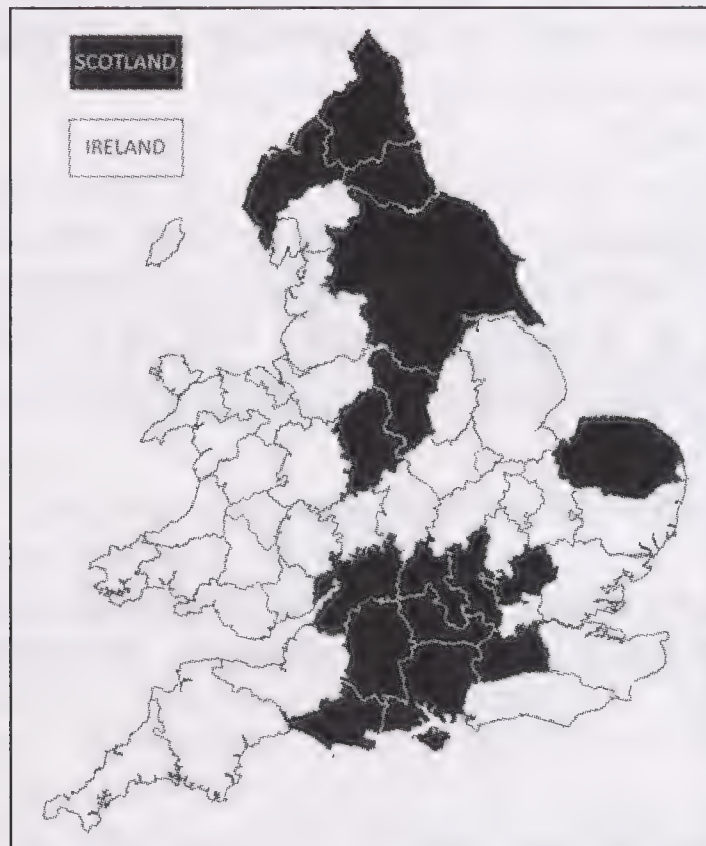


Fig. 1. The geographical distribution of *Strongylocoris leucocephalus* (L.) (Miridae) from the county records of Massee (1955).

There is insufficient space to publish the atlas within this journal, and it has therefore been placed on the internet in Portable Document Format (pdf), and can be downloaded using the link: <https://sites.google.com/site/robryanhp/MasseeAtlas1955.pdf>. The file size is about 20 megabytes. There is also a browseable version of the atlas which can be accessed using the link <http://www.robryanbugs.talktalk.net/Massee1955/index.html>. – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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COPROPHAGOUS FEEDING BEHAVIOUR BY TWO SPECIES OF NYMPHAL PENTATOMID

ALEX J. RAMSAY

44 Sun Lane, Burley-in-Wharfedale, Ilkley, West Yorkshire, LS29 7JB, UK
alexramsay6@yahoo.com

ABSTRACT

Final instar nymphs of the shieldbugs *Palomena prasina* (L.) and *Pentatoma rufipes* (L.) were observed feeding in the white part of bird droppings. This part consists mostly of uric acid, an insoluble compound rich in nitrogen, but potentially a rich source of nutrients to the nymphs if they possess the necessary metabolising endosymbiont bacteria found in other hemipteran groups. This is only the second recorded occurrence of coprophagy in nymphal Pentatomidae. A review of coprophagous feeding behaviour in the Pentatomoidea identified six species of Pentatomidae and one species of Scutelleridae. Coprophagous feeding remains unconfirmed in Cydnidae.

INTRODUCTION AND OBSERVATIONS

On 8th July 2007 final instar nymphs of *Palomena prasina* (L.) (Pentatomidae: Carpocorini) and *Pentatoma rufipes* (L.) (Pentatomidae: Pentatomini) were observed feeding on the white part of fresh bird droppings on wooden fence posts along a woodland margin in Wokingham, Berkshire (SU826695). In each case only a single nymph was recorded of each species exhibiting this feeding behaviour.

There has been only one previous record of this behaviour recorded in the literature for species of nymphal Pentatomidae (Londt & Reavell, 1982), suggesting that such behaviour is rare or at least rarely recorded. As the white part of bird droppings consists mostly of uric acid, it is suggested that these nymphs were specifically seeking out a source of dietary uric acid in order to supplement their diet.

DISCUSSION

Adler and Wheeler (1984) suggested that bird droppings are an attractive food source to seed-eating bugs as they contain partially digested seeds, however, in both instances involved here the bugs were feeding on the liquid white part of the droppings. This part of bird droppings consists mostly of uric acid, an insoluble compound rich in nitrogen (Hill *et al.*, 2012). Nitrogen is a major limiting factor in the diet of most phytophagous invertebrates (Chapman, 2013). Limiting nutrients such as N and Na are often obtained via extra-phytophagal feeding in insects, such as through the 'mud-puddling' behaviour exhibited by butterflies in the tropics, where sodium and other limiting minerals are obtained by feeding from the margins of drying puddles (Beck, Mühlenberg & Fielder, 1999).

Uric acid is the end product of purine metabolism in both birds and insects, and is not normally utilised as a nutrient by animals. However, in some cases where it is known to be recycled (e.g. in cockroaches (Dictyoptera) and termites (Isoptera)) the necessary metabolic conversion is done by symbiotic bacteria, either within the gut or fat body (Sabree, Kambhampati & Moran, 2009). Within the Hemiptera, presence of endosymbionts has been confirmed in the Sternorrhyncha, which are obligate sap feeders, and this endosymbiotic association is essential for the synthesis of amino

Table 1. Pentatomids showing coprophagy

Tribe	Species	Food source	Reference
Carpocorini	<i>Palomena prasina</i> (L.)	Bird droppings	This paper
Halyini	<i>Orthoschizops ?obsoletus</i> Dallas	Lizard dung	Londt & Reavell (1982)
Halyini	<i>Orthoschizops ?plagosa</i> Distant	Lizard dung	Londt & Reavell (1982)
Halyini	<i>Brochymena carolinensis</i> (Westwood)	Bird droppings	Adler & Wheeler (1984)
Pentatomini	<i>Pentatoma rufipes</i> (L.)	Bird droppings	This paper
Podopini	<i>Podops inuncta</i> (F.)	Mammal dung	Adler & Wheeler (1984); Southwood & Leston (1959)

acids, the building blocks of proteins (Baumann, 2005). Similar endosymbiotic associations have also been recorded in the Coccoidea and Auchenorrhyncha (Gruwell, Morse & Normark, 2007).

Within the Hemiptera-Heteroptera, the shield bug *Parastrachia japonensis* (Scott) (Parastrachiidae) is capable of recycling uric acid (Kashima, Nakamura & Tojo, 2006; Hosokawa *et al.*, 2010) due to the presence of symbionts in the gut, and a similar mechanism has been suggested for other shield bugs including *Plautia stali* Scott (Pentatomidae) (Kashima, Nakamura & Tojo, 2006). It is unclear if both *P. prasina* and *P. rufipes* nymphs have a mechanism to recycle uric acid, but if present it suggests that gut endosymbionts capable of recycling uric acid might be more widespread than previously thought amongst the Pentatomidae. Coprophagy has however, only rarely been recorded in the Pentatomidae, with a total of six species in which it has been definitely observed (see Table 1).

Londt and Reavell (1982) noted two species of *Orthoschizops* spp. (Pentatomidae: Halyini) feeding on lizard dung in South Africa. These were an adult female of *O. ? plagosa* Distant and a male, female and two final instar nymphs of *O. ? obsoletus* Dallas. The latter is the only other instance of nymphal feeding on dung recorded in the literature. They also noted *Solenostethium liligerum* Thunberg (Scutelleridae) feeding on goat dung in Botswana, apparently the only literature record of this family exhibiting coprophagy.

Adler and Wheeler (1984) recorded two species of Pentatomidae with coprophagous feeding behaviour: a female *Brochymena carolinensis* (Westwood) (Pentatomidae: Halyini) on bird droppings in the United States, and *Podops inuncta* (F.) (Pentatomidae: Podopini) on mammal dung, the latter cited from Southwood and Leston (1959) in Britain. The only other recorded occurrence of potential coprophagy is by Constant (2007), who noted a single occurrence of an adult *Sciocoris* (species indet.) (Pentatomidae: Sciocorini) on dog droppings, but he did not observe feeding taking place and hence it is not included in Table 1.

Ten species of Cydnidae have been recorded from pitfall traps baited with human excrement in Asia (Lis, 1994; Constant, 2007), though none was observed to feed directly, in common with the two other species of Cydnidae listed by Adler and Wheeler (1984). Therefore coprophagous feeding behaviour in the strictest sense has never been observed directly in the Cydnidae.

Coprophagous feeding behaviour in the Pentatomoidea has been recorded in six species in four tribes of the Pentatomidae with a single observation in the Scutelleridae. It is likely that other examples of this rarely recorded feeding behaviour will be detected as its occurrence does not appear to be confined to any particular family or tribe within the Pentatomoidea.

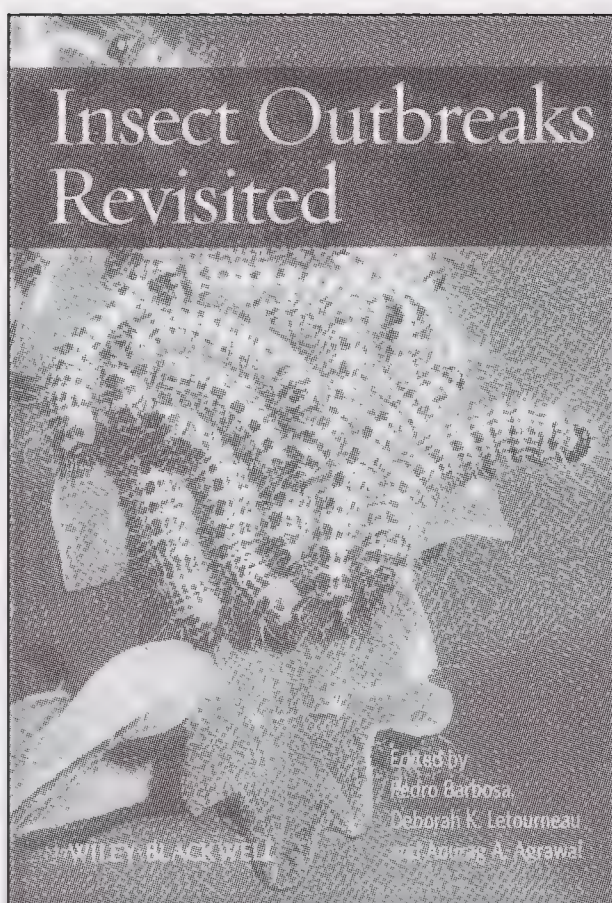
Additional examples of coprophagous feeding behaviour seem most likely in the Halyini, as it has been recorded in three species in this tribe from North America and Africa (Londt & Reavell, 1982; Adler & Wheeler, 1984). The observations on nymphs presented here add two additional species and two tribes, neither of which have previously been recorded as coprophagous.

ACKNOWLEDGEMENTS

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BOOK REVIEW

Insect Outbreaks Revisited edited by Pedro Barbosa, Deborah Letourneau and Anurag Agrawal. (Wiley-Blackwell, 2012). Hardback. 465 pp. \$129.95 plus p&p. ISBN: 978-1-4443-3759-4.

It has been more than 25 years since the publication of *Insect Outbreaks* (Barosa & Schultz, 1987). Over the past two decades, significant advances have been made in our understanding of outbreak (eruptive) species and outbreak dynamics. This book aims at updating the original work by presenting new insights, concepts and hypotheses concerning outbreak species and to revisit older concepts. Forty-three authors have contributed.

The book is divided into five parts. Chapters in the 'Physiology and life history perspectives' section discuss the importance of nutrition, the ratio of elemental nutrients, changes in the quality and quantity of food, physiological processes, such as immune responses, and how understanding these issues may lead to novel ways of investigating the causes and consequences of insect population outbreaks. Chapters in the 'Population Dynamics and Multispecies interactions' section provide insights into regional spatial synchrony of outbreaks, perspectives on how symbionts may play a significant role in some outbreaks, mechanisms in plants that are triggered by herbivory and feedback mechanisms and dendrochronological analyses involving the dating of past outbreaks through the study of tree ring growth over long time scales. Chapters in the 'Population, community and ecosystem ecology' section provide a comparison of the life history traits of outbreaking and non-outbreaking species, an overview of the consequence of insect outbreaks to other members of a community and how ecosystem services might be affected.

In the section on 'Genetics and Evolution', chapters explore the role of genetic differentiation in outbreaks occurring in agro-ecosystems and an examination of the fossil record to determine the degree to which detectable macroevolutionary patterns of outbreaks exist and if there are any phylogenetic constraints to those relationships.

Finally, chapters in the 'Applied Perspectives' section review what we know about the behaviour, ecology and evolution of pest species (including weeds) and the habitats in which they occur, as well as how future climate changes might alter critical interactions and dynamics of outbreaks.

This book is like the proverbial curate's egg; it contains some highly stimulating and controversial chapters brimming with insights and ideas about insect biology that want to make you rush into the field to study similar species here (if we have any left), interspersed with some pretty mundane chapters that frankly I wonder how or why the research was funded in the first place. Several chapters could have been omitted without diluting the book's message. As a reviewer I have diligently read every chapter – however I would advise potential readers to just focus on those aspects of outbreak biology that are likely to interest them and you will be amply rewarded. The book is full of good ideas. The editors have done a pretty good job and are to be congratulated.

JOHN BADMIN

REFERENCE

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CABINETS OF CURIOSITY

RICHARD A. JONES

135 Friern Road, East Dulwich, London SE22 0AZ
bugmanjones@hotmail.com

I have a confession to make. My reference collection is in a bit of a state. It is never been what you might call 'museum quality', unless you know of some pretty low-class museums. Instead, to put it optimistically, it might be described as just about adequately functional. It is housed in a motley assortment of small, ill-matched, shabby cabinets and sundry scuffed storeboxes. I still aspire, perhaps, to a wall of high-end, elegant mahogany units or some choice polished furniture pieces, but price and availability have always outwitted my pockets and my time. Ah well.

To some extent my library is similar. I've picked up books on the cheap, ex library copies, tatty and worn bindings, odd volumes, 'working copies'. However, one of the agreeable aspects of owning battered old books is that they are likely to contain the names and inscriptions of previous owners, owners who actually used them, rather than just had them sitting on the shelves unopened for decades. I know many of their names: authors themselves, of yet other books; bygone entomologists whose reports and articles punctuate the old journals; naturalists and collectors mentioned against prize specimens. Whenever I pick up one of these books I feel a real connection between myself and these long-departed naturalists from a century or more ago.

I also feel a connection through my entomological furniture, even though cabinets are not generally inscribed and the provenance of these unspectacular items is not often recorded. The trouble is, that to many people, cabinets and store-boxes are merely the anonymous receptacles in which specimens are temporarily housed. True enough, the scientific (and historical) value of an insect specimen resides in its tangible existence, its pin and its data label. Specimens move around the collection, around the country or around the world, but the box in which they entered the museum is often derided, or ignored. This, I think, is a shame.

I recently bought some small eight-drawer cabinets from the Natural History Museum. Like many of the odd-sized and inconveniently shaped containers they were surplus to requirements and I got them for a snip (£75–100 each). They were not antique, and not particularly handsome, but the tale that went with them gave them a historical significance well above their dowdy appearance. These were 'type cabinets', so-called because they were specially manufactured in the late 1930s to house the museum's important insect type specimens as a prelude to their evacuation in the event of the war-time bombing which seemed inevitable and imminent.

The eight small drawers, 15" (38 cm) by 11½" (29 cm) were housed in rougher, chunkier and sturdier carcasses than might ordinarily be expected, reinforced with metal bars above and below; the thick door carried a latex bolster to cushion the drawers when closed, and to the top of the cabinet was fixed a tough folding iron carrying handle. They were designed to be easily transportable and manoeuvrable.

Elsewhere in the museum, similar logistical problems were being considered for other important collections. Wheeler (2000) goes into some detail about the evacuation of the zoological collections at around the same time. His description of wooden chests (called 'evacuation boxes') built for the removal of fish skins suggests a similar, if slightly larger, construction. In at least one history of the Natural History Museum, (Stern, 1981) wartime evacuation to the Museum's outpost at Tring is quoted. However, some of the zoological collections discussed by Wheeler

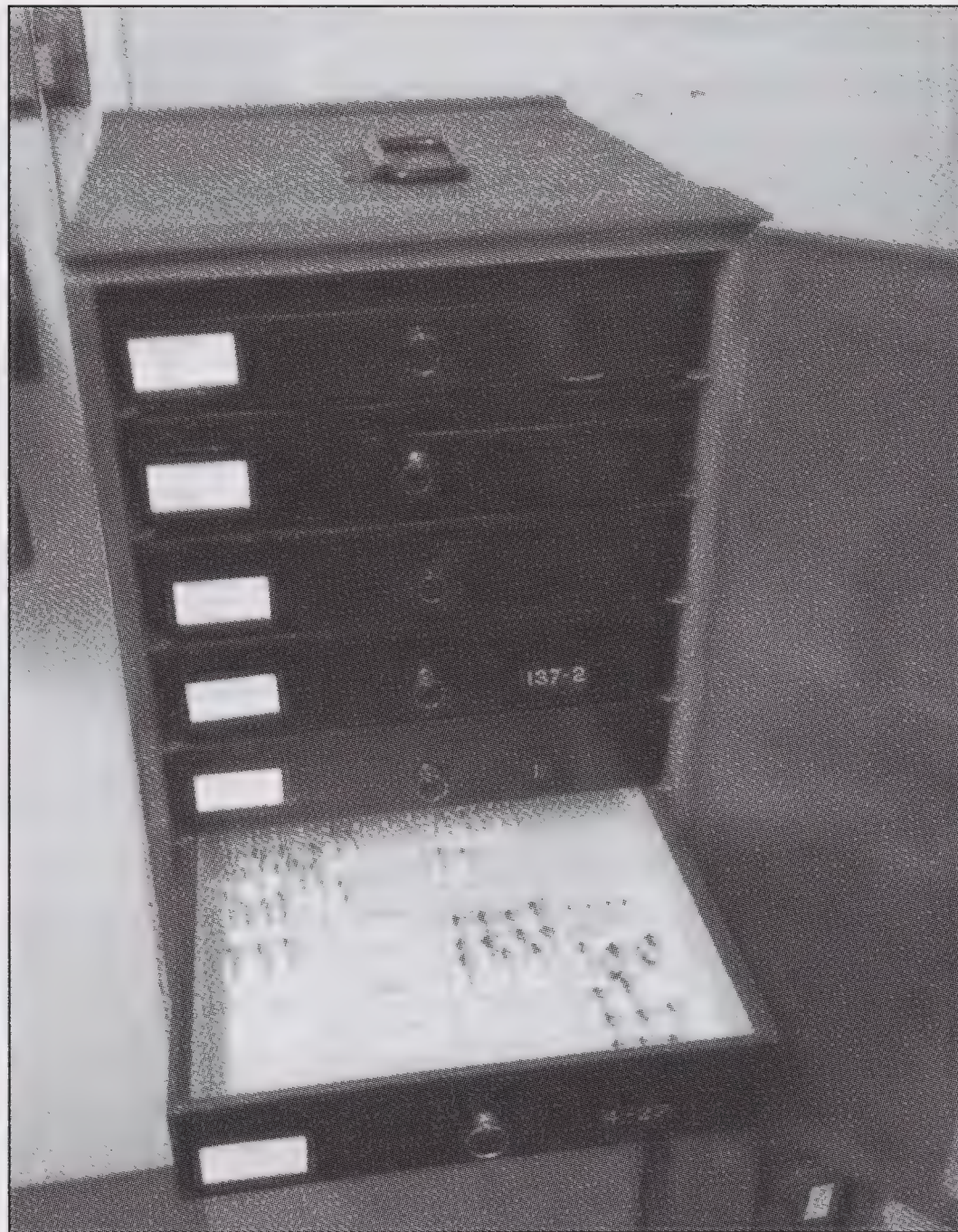


Fig. 1. War-time 'type' specimen cabinet from the Natural History Museum. A simple, but stout, construction and carrying handle made the cabinets easily transportable.

(2000) were apparently evacuated to various country houses, which he lists in an end note, and it seems likely that the precious entomological specimens went here too, or to other similar destinations. The spirit jars of the zoology collections were sent to Cart Horse Cave, old stone-workings near Godstone in Surrey, but damp giving rise to mould and fungus attacks on the boxes and labels would have made this entirely unsuitable for insect storage.

The drawers of my cabinets were variously labelled with stickers, painted numbers and barely legible white chinagraph pencil cyphers. Similar ink scrawls decorated the glass, and pencil scribbles the paper linings. Whether any of these marks pertain to wartime type evacuation or subsequent *ad-hoc* use I have no idea, and although I've left some, I've also cleaned some away. I can almost hear future historians groaning. Sorry guys.

Max Barclay, Coleoptera collections manager at the Natural History Museum tells me that although he sells a lot of furniture on behalf of the Museum, few people enquire after its provenance "it is not a question I often get asked", and even though it is very often the former property of someone they knew. Spurred on by the thought of my historical evacuation boxes, I did some of my own asking amongst friends and colleagues, and unearthed a surprising number of other people for whom provenance was very much the added value to their collection's housing.

At the same time that I picked up my 'type' cabinets from Max, my father Alfred Jones also made off with a small cabinet that belonged to Bookham coleopterist,



Fig. 2. ‘Feminine’ furniture from Bookham coleopterist, Alan Easton, now the property of Claudia Watts.

Alan Easton (1907–1989). Despite the fact that my father took an active part in the London Natural History Society’s survey of Bookham Common during the 1950s, he never crossed paths with Easton: “I knew of him, of course, but he tended to do his own thing and did not attend the LNHS field meetings.”

Claudia Watts is very proud to own another of Easton’s cabinets. “I don’t have any connection with Easton, I’m afraid! I just bought the cabinet from Max at the NHM – mainly because it was just so pretty I couldn’t resist it! It was only when I mentioned to another entomologist who it used to belong to (it had a bit of A4 paper taped to the glass saying ‘Easton Collection’ plus Max told me when I bought it) that I found out more about him and what he probably used to keep in it.”

“It’s quite small, about 34 inches tall, 12 cork-lined glass-topped drawers that aren’t deep enough for Continental pins (I keep hoverflies in it on micro-staging, so the length of pin is not so crucial), ivory handles and an ogee-topped glass insert in the door, which is decorated with marquetry butterflies. Altogether what I would think of as a rather feminine piece of furniture, considering! Definitely one to have on show rather than tucked away in a study like my other one (also from NHM), which is larger and more practical, but not particularly decorative.”



Fig. 3. Seven-drawer cabinet from the 'right' Dale collection, now owned by Mick Parker.

Mick Parker, it turns out, has one of J.C. Dale's cabinets, from the Hope Department, in Oxford no less. "It is a seven-drawer cabinet, which used to house Dale's arachnids; it was rendered surplus when for safety reasons the collection was being moved into more pest-proof cabinets. This was the first one that was emptied." Exactly whose cabinet it was proved the clincher for Mick, who would rather it came from J.C. himself (1792–1872), rather than from his son C.W. Dale (1851/2–1906). "Literature that I have read describes C.W. Dale as a bungling incompetent! And needless to say I would be ecstatic to purchase a J.C. Dale cabinet." Luckily, the Hope's Darren Mann provided the provenance: "As far as I know it was arranged by the father [J.C.] and added to by the son [C.W.] . . . The son was a bit of an idiot, his labelling and collections work certainly leaves a lot to be desired!"

The Hope Department also provided Tony Drane with his prized collections furniture: "I am particularly pleased to be the proud owner of Pickard-Cambridge's 40 drawer cabinet that I bought from the Hope department many years ago. George McGavin providing the provenance. While it being totally understandable that large institutions need to rationalise their many bequested collections into a unified system, there is probably a loss of lineage of cabinets in the process. Max's e-mail surprises me somewhat, as I would have thought 'whose cabinet was it?' would be the first question asked by the potential buyer. It is part of the 'romance' of entomological history. The same sort of pleasure as owning a book which once belonged to one of the great past entomologists, knowing they had used it and, if you are lucky, annotated it. Functionality is not all."

Some cabinets do have their history pinned to the carcass. Rex Harvey recalls: "I started with a tabletop six-drawer cabinet given to me by my uncle, and used store

boxes until March 1961 when I bought a huge Brady double sided cabinet with a display or book shelf section in the middle, behind a glazed door. The cabinet had been made for a schoolmaster presumably on his retirement in the late eighteen nineties and it had an engraved silver plaque on the large top which read: 'Presented to John Sharp MA of Paradise House School in respect of our esteem and regard 1896'. The cabinet was sold to me by Richard Ford of Watkins and Doncaster for the princely sum of fifteen pounds and the handyman/engineer 'Old Biddle' said it was too big for them, they were intending to cut it down. I was lucky to own another two Brady cabinets during my collecting life, both eighteen drawer examples for which I paid I recall fifty and seventy five pounds respectively in 1973/5. Tony Pickles now has my 'big' Brady which was cut down professionally in the early eighties to make a free standing sixteen-drawer unit on which the original silver plaque now resides."

Other cases are, perhaps, waiting for similar plaques to be installed. Mike Morris's already has quite a history. "When I was a Cambridge undergraduate (yes, a long time ago!) I was told of a 40-drawer cabinet that was being sold at the Hockerill Teachers' Training College. It had been acquired by a lecturer who had retired and been replaced by an embryologist who was uninterested in entomology. I bought the cabinet (a Watkins & Doncaster job so not an especially good one). However, the price, £10, made it quite a snip, even for those far-off days. It cost a good deal more to get it home! I thought it would do for my legs (I'd not done much with beetles in those days), but it proved to contain an interesting collection of micros, almost certainly (so Michael Chalmers-Hunt told me) the C. W. Corder collection, which of course I did not want to throw out."

Not all the historical cabinets are fancy pieces of carpentry. Dafydd Lewis has a 20-drawer cabinet, "quite well made for a DIY job – has a glass front, drop-in drawers etc. I bought the cabinet at Kempton Park [Amateur Entomologist's Society Annual Exhibition], David Lonsdale told me he thought it had been made by Peter Cribb." Cribb (1920–1993) was a stalwart member of the AES, and often cited by people as the stimulus for their interest in entomology.

Amongst the genuinely interesting historical connections, there are also prosaic observations about seemingly unremarkable cabinets. When prompted, Garth Foster reported that: "My 32-drawer cabinet – on its back some holes made by a dart. Jon Cooter can explain." The mystery deepened when Mr Cooter rebutted: "Alas, I cannot offer any explanation and have no memory of throwing darts at it Are you certain it's not woodworm?" To which the reply: "The possibility that it might be woodworm certainly reduced its purchase value!" At which point the email spat ceased.

Some of the oddest tales come from cabinets picked up outside of the entomological community. Michael Darby acquired his from the Victoria and Albert Museum. "My early professional life was spent in the V&A. My two 40-drawer cabinets came from the Metalwork Department which had acquired them for the storage of jewellery. The intention was to remove the glass tops and line the drawers with velvet or similar, but fortunately that never happened."

"The cabinets were from the NHM. Their date has always been a bit of a puzzle to me. The quality of the cabinet work suggests c.1870 but one is lettered 'HEMIPTERA' in what appears to be an older style. It would be wonderful if they transferred from Holborn to S. Kensington, i.e. were originally 18th century but I have nothing to prove that."

My father's first insect cabinet was originally used to stock fishing flies, rather than Diptera. "On audit for my firm [he was an accountant] I went to Cogswell and Harrison, who sold guns and other accessories, in about 1950. I noticed a cabinet



Fig. 4. Once used to house fishing flies and as a work bench to paint duck decoys, this 60-drawer cabinet has been renovated and rejuvenated for insect storage by Alfred Jones.

with many drawers which was being discarded. It had been used as a bench for painting duck decoys and was spattered with paint. They said I could have it for thirty shillings (or that was the carriage, or both). At home I scraped off all the paint and varnish (assisted I think by my mother) with the old-fashioned double-sided razor blades – you had to be careful not to cut yourself. It was then clear varnished, and the knobs painted black. Eventually I made a door to it as the drawers were not glass-covered (and still are not). The cabinet was made of solid beech wood and very stoutly constructed. There were 60 drawers of $12'' \times 9\frac{1}{2}''$ internal measurements. At first all my insects were kept in it, with plenty of space over. On marrying in 1957 my wife took up Lepidoptera and gradually took over the whole cabinet which stands in my study now with her collection.”

From my own collections miscellany, the item that holds the strangest historical connection for me is a small, shallow, delicate, almost flimsy, 10-drawer glass-fronted cabinet. It belonged to R. Lovell-Pank, who, according to the brief biography given during the 1986 BENHS Presidential Address (Baker, 1986) was an actor and tourist guide and interested in the Lepidoptera. He died on 12 September 1985, at (or shortly after) the BENHS meeting held that day at the rooms of the Alpine Club in Mayfair’s South Audley Street.

It was the joint meeting of the BENHS and London Natural History Society and the lecture hall was packed. At some point during the exhibits and communications portion of the meeting there was a loud cry of “Can someone help this man?” as a member of the audience collapsed onto the floor. Chairs and benches were hastily pushed back and several people gathered round to administer CPR and whatever other medical help they could offer. It was a baking hot day and I remember busying around trying to open some windows as we waited in the stifling heat for the ambulance to arrive.

No mention of Mr Lovell-Pank’s illness occurs in the dry write up of that meeting (Anon, 1986), but after a short break Paul Sokoloff, who as Vice-President was

chairing the meeting, made an announcement. It was felt that since the evening's lecture was to be about British butterflies, and that as Mr Lovell-Pank was a keen lepidopterist, he would have wanted the meeting to continue. I was always rather impressed that Ken Willmott was able to continue with his talk in the slightly surreal circumstances. A few weeks later Peter Baker, then President of the British Entomological and Natural History Society, was helping dispose of the Lovell-Pank collection and I was able to buy the empty cabinet. I never knew Mr Lovell-Pank, possibly never even spoke to him, though I was a regular attendee at London indoor meetings by then, but now always remember him, and that roasting September day, whenever I open one of the drawers.

ACKNOWLEDGEMENTS

My thanks go to the various people mentioned who contacted me about their mementoes: Maxwell Barclay, Jonathan Cooter, Michael Darby, Tony Drane, Garth Foster, Alfred Jones, Rex Lane, Dafydd Lewis, Mike Morris, Mick Parker, and Claudia Watts.

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SHORT COMMUNICATION

***Myrmedobia exilis* (Fallén) (Hemiptera: Microphysidae) new to Oxfordshire (VC23).** – On 2 July 2010 whilst beating juniper, *Juniperus* spp. (Cupressaceae), at Beacon Hill, Aston Rowant, in the Oxfordshire Chilterns (SU727972), I took a single male specimen of this tiny, seldom-encountered bug, formerly known as *Myrmedobia tenella* (Zetterstedt). Masee (1955) does not list this species for Oxfordshire, and I could not find a published record in the national entomological literature, although Woodroffe (1963) reports the species from litter under juniper at Coombe Hill, in the Buckinghamshire Chilterns, 15km to the north-east. (The apparent record for Oxfordshire in Woodroffe (1962) is corrected in Woodroffe (1963).) The Oxfordshire recorder, Mr John Cambell, subsequently confirmed this species as being new to the vice-county list. On 29 August of the same year whilst suction sampling moss amid the downland turf, using a Halfords car vacuum cleaner (Ryan, 2011), I took a second specimen at the site, this time a female. The moss was about 50m from the junipers beaten earlier in the year and both specimens presumably came from the same population. The moss species sampled were *Pseudoscleropodium purum* (Hedw.) Fleisch. (Brachytheciaceae) and *Rhytidiadelphus squarrosus* (Hedw.) Warnst. (Hylocomiaceae).

I have since found a second Oxfordshire site for this bug, also in the Chiltern Hills, at the Warburg Reserve near Henley (SU716880), managed by Berkshire, Buckinghamshire and Oxfordshire Wildlife Trust (BBOWT). On 26 June 2012, two females were taken whilst suction sampling moss using a Vax LiFE handheld vacuum cleaner (Ryan, 2012), under trees along the edge of a farm track passing through the reserve. The mosses sampled here were *Thuidium tamariscinum* (Hedw.) Schimp. (Thuidiaceae), *Eurhynchium striatum* (Hedw.) Schimp. (Brachytheciaceae), *Kindbergia praelonga* (Hedwig) Ochyra (Brachytheciaceae), *Brachythecium velutinum*

(Hedw.) Schimp. (Brachytheciaceae), *Mnium hornum* Hedw. (Mniaceae), *Thamnobryum alopecurum* (Hedw.) Gang. (Neckeraceae) and *Isothecium alopecuroides* (Dubois) Isov. (Lembophyllaceae).

There is a single report in the national entomological literature of the bug from the neighbouring vice-county of Berkshire, from Bagley Wood, south of Oxford, in the 1980s (Campbell, 2008). To this I add three more recent records for the vice-county: Park Wood (BBOWT Moor Copse), along the banks of the River Pang, near Pangbourne on 29 June 2010 (two males) and The Holies (National Trust), Streatley, North Wessex Downs on 8 July 2010 (three males) and 25 June 2012 (five males and seven females, reared from nymphs). These additional records were all from suction sampling moss under the cover of trees, using the previously mentioned appliances. At the former site, the species of moss were not noted, but at the latter, a single species was sampled, *Polytrichastrum formosum* (Hedw.) G. L. Smith (Polytrichaceae).

Southwood & Leston (1959) reports the bug as being associated with moss, especially *Polytrichum commune* Hedw. (Polytrichaceae) and *Rhytidiadelphus triquetrus* (Hedw.) Warnst. (as *Hylocomium triquetrum* (Hedw.) Schimp.) (Hylocomiaceae), growing in open clearings or under conifers on acid or sandy soils. These comments suggest a range of mossy situations in which the bug might be found, which my own records indicate are even broader in scope. Neither of the moss species named by Southwood & Leston were sampled at the three sites where the particular mosses were noted and there are no overlaps in the moss species noted at these three sites. At one of the sites under trees (The Holies), collecting was confined to a small area, and the tree cover was determined as oak (*Quercus* spp., Fagaceae), birch (*Betula* spp., Betulaceae) and beech (*Fagus* spp., Fagaceae), with no conifers in the immediate vicinity. This site, like Beacon Hill and Warburg Reserve, is on chalk, in contrast to Southwood & Leston's reported soil types. Clearly, it is difficult to pin down the precise habitat requirements for the insect. Presumably, wherever this carnivorous bug finds a microhabitat with invertebrates upon which it can prey, it is likely to take up residence, regardless of whether this is in a wet, sheltered, lowland wood such as Park Wood, or on a dry, exposed, upland chalk down such as Beacon Hill.

I am very grateful to John Campbell for his help establishing the status of this species. The insect specimens were identified using Péricart (1972). Some images of the bug can be found by searching Flickr (<http://www.flickr.com>). – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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GLEND A ORLEDGE

BENHS President 2012–2013

Perhaps natural historians are born rather than made. Certainly this was the case for me. I have always been interested in the natural world and as a child, first in south London and then in Sussex, I always yearned to be ‘in the country’. Shunning the urban environment I netted newts and frogspawn and gazed at whirligig beetles in the local pond, watched my jamjar caterpillars metamorphose, kept earthworms and ants in soil sandwiched between panes of glass and began to appreciate plant diversity while weeding my parents’ garden. Leafing through cherished field guides familiarised me with groups of plants, animals and fungi and, most importantly, with their names and where they might be found. Foremost amongst these books was McClintock and Fitter’s *Pocket Guide to Wild Flowers* (Collins, 1956) – the one with a pink dust jacket and stars denoting the rare and scarce species. It was my prize for a pressed flower collection in my first year at the local grammar school and is still well-used. As I browsed through its plates, linking them to the all-important starred entries in the text, my interest in species occurrence and the potential of biological records was born. What fun – and what a wonderful way to learn. How fortunate I was to have parents who enjoyed botanising on country walks and belonged to the local natural history society. My father, Lionel Beckett, was my inspirational mentor. With him I went to London’s Royal Institution where I saw moon rocks and visited Michael Faraday’s laboratory. With him I marvelled at what liquid nitrogen can do to an old cotton handkerchief and helped to make up solutions for processing his black and white photographs. It was my father’s colour slides of plants, animals and fungi, and the places where we had found them, that gave so much pleasure to family and friends on dark winter evenings at home.

But it wasn’t until some years later, after training as a teacher of biology and drama and, regrettably, after my father’s death, that the opportunity came for me to build on my childhood enthusiasms and experiences in ways that I could not possibly have imagined. In pursuit of my long held wish to teach field studies I embarked on an Open University degree to update my knowledge of biology and enjoyed some geology and oceanography along the way. A subsequent visit to Nigel Franks’ ant laboratory at the University of Bath led, unexpectedly, to my MPhil on the delightful little ant now known as *Temnothorax albipennis*, an excursion into ant taxonomy encouraged by Barry Bolton and an invitation from Stuart Reynolds to join his laboratory and study an insect taxon of my choice for my PhD. I chose the Ciidae which, fortuitously, exploit the weird fruiting bodies of wood-rotting basidiomycete fungi that have always fascinated me. My work towards an acting diploma was shelved and lack of time eventually led me to relinquish my role as BWARS ant recorder.





Glenda with audience. Photo: James Doughty.

I discovered the Ciidae 17 years ago. Thanks to the kind and generous support of entomologist Stuart Reynolds, mycologist Alan Rayner, my recording colleague Paul Smith, museum staff and other valued friends and colleagues too numerous to mention here individually, I continue to work on these small beetles, with my interest in the family now extended to include the taxonomy and occurrence of its members outside the UK. My research is facilitated by the University of Bath and this gives me the welcome opportunity to pass on my interest in, and enthusiasm for, the natural world and whole organism study to undergraduates. Moreover, the University's field course module has enabled me to fulfil my wish to teach in the field. But teaching this module has also served to heighten my concern about the lack of experience and understanding of the natural world of many of our biology students. In this increasingly urbanised, technological and target-driven world they have not had the opportunities that I and, I suspect, many BENHS members, have had to explore, observe and learn about the natural world. They really are disconnected from nature, and that it is possible not only to recognise and name, but also to comment on, organisms in the field is a revelation to many of them. This disconnection of students from an essential element of their chosen discipline suggests an increasingly important role for our Society. The BENHS is ideally placed to reach out to these students and introduce them to the delights and importance of the study of natural history – and entomology in particular. After all, among them may be the future experts in taxonomy and field ecology that are so badly needed.

Prompted by BWARS' Mike Edwards I joined the BENHS in 2001. I discovered an excellent and friendly society that commands respect and admiration and of which I am proud to be a member. To be able to serve the BENHS as President is, indeed, a great honour. I am now both naturalist and academic, and hope that I can use this plurality to benefit our Society. Of course I shall not, as the heading of this piece suggests, be President for a full two years. Rather, there were a few months tacked on to the beginning of my term of office consequent on the extension of Tony Pickles' presidency after his recovery from illness. I have already had the pleasure of renewing existing BENHS acquaintances and of talking to other members for the first time. I hope to meet many more Society members in the next few months, and look forward to my remaining time as President.

COUNCIL AND OFFICERS' REPORTS FOR 2012

COUNCIL'S REPORT

This report on behalf of the BENHS Council is rather different from many preceding Council's Reports due partly to the extension of Tony Pickles' Presidential term to the end of November.

Council and its meetings

The Council held seven meetings during the year, six at the Conway Hall in London and one at the Society's headquarters at Dinton Pastures. Attendances at Council meetings have been consistent, averaging 15 members. Members of Council may be honorary officers, serve on our various subcommittees or represent the Society on other committees – there is plenty of work. No Council meeting is ever 'routine', and new issues concerning the Society and its activities, or of relevance to our membership and the affiliated societies, are brought to every meeting.

As a consequence of Tony Pickles' sudden illness in the second half of 2011, Council resolved that his period as our President should be extended to the end of November 2012. The new President (Glenda Orledge) would then take up the role on 1 December 2012, and her Presidency would then run to the AGM in 2014. These changes were approved at the AGM on 17 March 2012.

Two important changes to the administration of the Society happened in 2012. As recorded in the Council's and President's reports for 2011, John Muggleton finally extricated himself from the role of Hon. Secretary, after 22 years of invaluable and greatly appreciated service. Despite advertising the position, no volunteer to take his place came forward at that time. Partly as a consequence, Council decided to implement a proposal that had come out of the special meeting of Council in May 2011 – to recruit a paid, part-time Administrative Assistant. We have been most fortunate to recruit Rosemary Hill to this post, which she took up in June 2012. Beulah Garner has kindly volunteered for the role of new Hon. Secretary, with effect from the 2013 AGM.

It is with great regret that Council learned of Ian McLean's intention, for health reasons, to stand down from the role of Lanternist and Indoor Meetings Secretary and Chairman of the Publications Committee. With the exception of a couple of years he has served on the Council continuously, in various roles, for 25 years. He will be sorely missed.

Membership of the Society

Membership numbers have shown a welcome slight increase from 834 at the end of 2011 to 847 at the end of 2012. During the year 42 new members were elected, there were 10 resignations, and 14 members were struck off for arrears in payment of subscriptions. We have 12 Honorary, 44 Life, 726 Ordinary, 13 Corporate, 2 Junior and 50 Special Life members. Five members, S. A. Knill-Jones, D. Stimpson, S. L. Sutton, T. Takakura and C.N.D.D. Threadgall, have been members for 50 years and qualified for Special Life member status at the end of 2012. Sadly, the deaths of six long-standing members were reported: C. E. Dyte, E. W. Groves, Miss J. F. A. Matthews, P. A. Sokoloff, Eileen Thorpe and G. D. Trebilcock. Paul Sokoloff was a former President and Eric Groves was a Special Life Member.

Although our membership is stable, Council is aware of the need to continue to attract new members, and in particular to engage with young people with an interest

in entomology. With this in mind, Council resolved to collaborate with the Amateur Entomologist's Society to support The Bug Club, initially for one year on a trial basis.

The Pelham-Clinton Building

The Society's headquarters at Dinton Pastures, and its contents, are major assets for the Society. The Pelham-Clinton Building houses our collections and library, is used for workshops and meetings, including those of affiliated societies, and is used occasionally for social gatherings. One such, on 22 April, celebrated completion of the restructuring, refurbishment and equipping of parts of the building, and marked the formal opening of the Graham and Helen Howarth Room, now linked through to the rest of the building. Special guest, Graham Howarth was greeted by the President and more than 60 members and their guests. Particular thanks are due to Martin Albertini, who project managed the building changes and improvements, and who, with a few other volunteers, made good and decorated the interior of the room. Thanks are also due to all who made this day such a success

To increase the facilities at the Pelham-Clinton Building, a successful application was made for OPAL funding to purchase digital projecting equipment for use with microscopes there. This will be particularly useful for workshops involving training in identification. The collections and library, such important features of the Society, are reported on separately. A fascinating addition was Malcolm Simpson's collection of entomological equipment and ephemera, which was kindly donated by Pam Simpson.

All buildings bring responsibilities for maintenance and dealing with unexpected problems. Martin Albertini's ability to respond to such needs has been affected by his illness and Jon Cole and Rosemary Hill have covered for him as necessary. We record our grateful thanks to Jon and Rosemary for this efficient and willing help, and to other members who have ensured the smooth running of the Pelham-Clinton Building during Martin's absence.

Publications

Colin Hart's *British Plume Moths* (published in 2011) has continued to sell, and a reprint of Stubbs and Falk *British Hoverflies* was produced during the year to meet the continuing demand for this popular title. Progress with a new edition of *British Soldierflies* (Stubbs & Drake) has been slower than expected, but it is hoped that it will be published in the first half of 2013. The storage of stocks of these and other titles does pose problems (of space), but practical solutions have been found. Council is very grateful to Michael Darby for his careful management of sales of our publications. John Badmin's overview of our Journal is reported separately.

Website

Our website is managed by Tony Prichard who aims to keep the website up-to-date with news and events of relevance to our membership. A website is also a valuable method of communicating with the wider entomological community, at home and abroad, and will in future certainly become an increasingly important asset and resource for the Society. Our Facebook page is increasingly used as a means of communication between members.

Programme of events

Many events are held for members and guests throughout the Society's year. This starts with the AGM and Members Day which, in 2012 was held on 17 March at the Oxford University Museum of Natural History, and attended by 45 members and five guests. The main gathering of members is, of course, at the Annual Exhibition, held in 2012 on 3 November, at the Sherfield Building of Imperial College in London. It was attended by just over 200 members and visitors, almost a quarter of our total membership. It was followed by the BENHS Dinner at the Strathmore Hotel, South Kensington, where the good food and company was enjoyed by all who attended. Unfortunately, the substantial annual increase in charges for the use of Imperial College meant that Council decided that it is no longer a good use of the Society's limited resources to continue to use this venue. In 2013 the Exhibition will be held at Kempton Park, Surrey, and early in 2013 Council will be asking members for their views on the venue for the Exhibition in future years.

There were twelve BENHS workshops held in 2012, three in the Angela Marmont Centre at the Natural History Museum and nine at Dinton Pastures. A total of 169 participants attended these events. In addition, the 9th Coleopterists' Day was held at Oxford and the first Hemipterists' Day was held at Dinton Pastures. There was an additional indoor meeting, jointly with the London Natural History Society, organised by Ian McLean. Council is very grateful to Ian, who developed and maintained a diverse programme of workshops and other indoor meetings over many years.

For many, the most enjoyable part of entomology and natural history is getting out in the field and observing, collecting and recording our chosen taxa in the company of like-minded people. The Society's Regional Meetings (co-ordinated by Claudia Watts), the Field Meetings (co-ordinated by Paul Waring), and the meetings of our affiliated societies provide these opportunities.

Two, two-day regional meetings were held during the year. In February the meeting at Preston Montford, Shropshire was jointly with the Shropshire Invertebrates Group, hosted by the Field Studies Council Invertebrate Challenge and organised by Pete Boardman. The talks on Saturday were attended by 55 people, with 42 taking part in a series of identification workshops on the following day. In May a meeting in Breckland was held at Elveden, on the Suffolk/Norfolk border, attended by some 40 people, with a good range of interesting speakers. The following day, 17 people met for a field meeting on the Elveden estate.

The Field Meetings programme for 2012 included 15 field meetings and other field events, running from mid-May to mid-October, as far afield as the New Forest, North Wales, Breckland and Speyside. In addition, John Showers organised 18 special field meetings in Northamptonshire covering a wide range of habitats. Despite the weather, none of the Society's events was cancelled, but inevitably many were poorly attended. Reporting the results of field meetings is a slow process, but the back-log of reports has been reduced during 2012, including greater use of the BENHS website. Paul Waring highlighted the importance of providing field meeting reports to landowners and others who collaborate with the Society in holding these meetings.

Another eventful year; pity about the weather!

PAUL HARDING
with contributions by other Council members.

TREASURER’S REPORT 2012
FINANCIAL YEAR TO 31 DECEMBER 2012

Over the year maintaining our charitable activities produced a slight deficit of £1,913. This included the benefit of a substantial legacy of £20,000 from our late member Alan Wheeler. Adding back the non cash item of depreciation shows a cash surplus of £5,783. Some savings have been made in our charitable expenditure but management costs have increased with the necessary appointment of an administrative assistant. Next year we can look towards savings from a change in exhibition venue.

Overall the Society produced a surplus of £10,910 due to the positive revaluation of our investments. This partial recovery in the value of our investments was coupled with an increase in investment income.

Capital expenditure consisted mainly of the cost of furnishing the Graham and Helen Howarth Room and improving storage and facilities in the library at Dinton Pastures. A reprint of ‘British Hoverflies’ towards the end of the year resulted in an increase in the end of year stock valuation.

The Society remains in a healthy financial state and we shall endeavour to cover our charitable expenditure from income.

I would like to thank Roger Hawkins for his continuing work with subscriptions and Tony Pickles for his advice in preparing the accounts.

Thanks also to Phil Porter and Alan Philips for the work they have done in their examination of the accounts.

A full set of accounts will be lodged at Dinton Pastures and may also be obtained on application to the Treasurer.

JOHN FLYNN

Statement of Financial Activities
for the year ended 31st December 2012

	Unrestricted Funds £	Restricted Funds £	Endowment Funds £	Total Funds 31.12.12 £	Total Funds 31.12.11 £
<i>Incoming Resources</i>					
Bequests and donations	20989	—	—	20989	40100
Subscriptions	16661	—	—	16661	16061
Investment Income	4181	2,614	928	7723	6878
Trading Income	—	7895	—	7895	15144
Sundry Income	1526	—	—	1526	1255
<i>Total Incoming Resources</i>	43357	10509	928	54794	79438
<i>Resources Expended</i>					
<i>Direct Charitable Expenditure:</i>					
Cost of Journal & Distribution	13435	—	—	13435	14430
Cost of Facility at Dinton Pastures	—	7625	—	7625	9701
Members Meetings and Services	15817	—	—	15817	14836
Library and Curation	1268	—	—	1268	4586
Grants	—	—	—	—	1500
Depreciation	5000	2696	—	7696	6511
	35520	10321	—	45841	51475

Statement of Financial Activities
for the year ended 31st December 2012

	Unrestricted Funds £	Restricted Funds £	Endowment Funds £	Total Funds 31.12.12 £	Total Funds 31.12.11 £
Other Expenditure:					
Management Costs	6974	—	—	6974	1930
Trading Costs	—	3892	—	3982	4875
	6974	3892	—	10866	6805
Total Resources Expended	42494	14213	—	56707	58280
Net Resources Before Transfers	863	(3704)	928	(1913)	21157
Net Incoming/Outgoing Resources	863	(3074)	928	(1913)	21157
Gains & Losses on Investments:					
Realised	—	—	—	—	—
Unrealised	6936	4344	1543	12823	(1614)
Net Movement in Funds	7799	640	2471	10910	19453
Fund Balances Brought Forward					
At 1st January 2012	£103287	£298998	£28025	£430310	
Fund Balances Carried Forward					
At 31st December 2012	£111086	£299638	£30496	£441220	

Balance Sheet as at 31st December 2012

	2012 £	2012 £	2011 £	2011 £
Fixed Assets				
Tangible Assets		192204		183092
Investments		231957		219134
		424161		402226
Current Assets				
Stocks	13978		10617	
Debtors	6700		7287	
Cash at bank and in hand	1629		14018	
	22307		33801	
Creditors:				
amounts falling due within one year	5249		3840	
Net Current Assets		17059		28084
Net Assets		441220		430310
Funds				
Endowment Funds – Hering Fund		30497		28026
Restricted Funds				
– Housing Fund	199947		203309	
– Special Publications Fund	95813		91809	
– Dinton Pastures Fund	3878	299637	3878	298998
Unrestricted Funds:				
Maitland Emmet BENHS Research Fund	59966		55966	
General Fund	51119	111085	47320	103286
		£441220		£430310

Tangible fixed assets	Leasehold Property £	Fixtures & Equipment £	Total £
<i>Cost</i>			
At 1 January 2012	188736	95662	284398
Additions		16808	16808
Disposals			
At 31 December 2012	<u>£188736</u>	<u>£112470</u>	<u>£301206</u>
<i>Depreciation</i>			
At 1 January 2012	42841	58464	101305
Charge for year	2696	5000	7696
On disposals			
At 31 December 2012	£45537	£63464	£109001
<i>Net book values</i>			
At 31 December 2012	<u>£143199</u>	<u>£49006</u>	<u>£192205</u>
At 31 December 2011	<u>£145895</u>	<u>£37198</u>	<u>£183093</u>
Investments	2012		2011
	M.V. £	Cost £	M.V. £
			Cost £
Shell T & T	23055	1250	25970
Unilever	28570	248	26335
M & G Charifund	75252	20238	63870
Hendersons Bond	57108	58000	54296
Architas Bond	47971	38500	44162
	<u>£231956</u>	<u>£118236</u>	<u>£219133</u>
			<u>£118236</u>

Unrealised gains arising in the year are shown in the Statement of Financial Activities.

Funds	Tangible Fixed Assets £	Current Investments £	Net Assets £	Total £
Analysis of net assets between funds				
Endowment Funds:				
Hering Fund	—	8773	645	9418
Restricted Funds:				
Housing Fund	143199	148518	10992	302639
Special Publications	24554	1806	26360	
Dinton Pastures	1242	91	1333	
Unrestricted Funds:				
BENHS Research Fund	18077	1329	19407	
General Fund	49006	30792	2264	82063
	<u>£192205</u>	<u>£231597</u>	<u>£17058</u>	<u>£441220</u>

These abbreviated accounts are extracted from the Trustees’ Report and accounts, a full copy of which has been lodged at Dinton Pastures and is available to members upon application to the Treasurer.

JOHN FLYNN

EDITOR’S REPORT

Volume 25 of the *British Journal of Entomology and Natural History* was published in four parts in March, June, September and December 2012. Slightly fewer manuscripts were submitted during the year, so the volume length, 240 pages, was shorter than in 2011. This meant the volume length was below average when compared with recent issues but probably not significantly so.

Seventeen papers, 24 short notes and 14 field meeting reports, in addition to Society news were published during the year. Many of the papers reported species new to Britain, covering Hemiptera (scale insects, aphids, leafhoppers), Lepidoptera and Coleoptera. Significant papers were ‘The sale of Lepidoptera in Britain: a review

of current legislation concerning the sale within Britain of protected species of European Lepidoptera' by Mike Harvey and 'A change in funding directions: implications for biological recording' by Roger Morris.

It was pleasing to publish papers on the behaviour of flies (2, Jolyon Alderman), bumblebees (Adrian Plant) and beetle ecology (Keith Alexander) and improved sampling techniques (Rob Ryan). The President also supplied several articles about the Society including a report on the official opening of the Graham and Helen Howarth Room at Dinton Pastures.

There were 12 book reviews and four obituaries: of Ronald Payne, Pierre Viette, Stig Torstenius and Bernard Verdcourt, all kindly written by members of the Society.

Once again I wish to thank Roger Hawkins, Norman Hall and David Young for the onerous task of preparing the Index to the previous volume. Thanks also to Jolyon Alderman, Adrian Knowles, Darren Mann and Phil Porter for time spent proof reading and to the Exhibition recorders, Aaron Jones, Sean Clancy, Richard Dickson, Norman Hall, Peter Chandler, Peter Hodge, Alan Stewart and David Baldock for preparing the report of the 2011 Exhibition and to Jon Cole as Exhibition photographer. I would also like to thank those who submitted photographs for the front cover – Andrew Salisbury, Chris Manley, Peter Maton and Kevin McGee and look forward to receiving more good photographs in 2013. Finally I would like to thank those who kindly offered to act as referees.

JOHN BADMIN

CURATOR'S REPORT

It was agreed during 2012 that the repinning and labelling of the Coleoptera collection, as first envisaged in the report for 2008, would be funded from the bequest received in the preceding year from Andy Callow. An allocation of £12,000 was proposed, both to provide the materials required and to employ somebody to carry out this work, for an initial period of six months. This work will be done at the Oxford University Museum under the supervision of Darren Mann, beginning in 2013. It is proposed that all specimens will be staged at a standard height using No. 6 Austerlitz pins, labelled with the name over which they currently stand, and arranged according to the latest Coleoptera checklist. The progress made under this contract will determine whether further funding is necessary for the project.

Members of Russell Bretherton's family, including three of his four children, came to view his collection on two occasions, in April and October, exactly six months apart. Russell's collection of British and European butterflies is on loan from the Reading Museum, so is maintained as a separate entity to the Society's European butterfly collection. The first visit by Russell's eldest son Michael Bretherton, Michael's daughter Isobel and her daughter Ella, was reported in an article in the journal (2012. 25: 179–180). Then we were visited on 28 October by Russell's daughter Susan Stokes, her brother James Bretherton and his wife Harriet. All expressed pleasure at seeing Russell's collection again. James Bretherton wrote that the visit "brought back many vivid memories, and a great feeling of satisfaction that it has been so beautifully preserved and can be seen by those who want to". Harriet Bretherton also enquired about the collection of another former president, Captain John Ellerton, who was her uncle (her mother was his wife's sister). Captain Ellerton's collection of micro-moths, which came to the Society following his death in 1971, is a significant part of the Society's Microlepidoptera collection, although his collection is also represented in the Bucks County Museum.

As part of the reorganisation of the Pelham-Clinton building that has taken place over the past two years, a new freezer was purchased to assist with pest control in the collections. This was obtained in March and was installed in a corner of the Howarth Room. It has already sustained some use as minor infestations of *Anthrenus* continue to appear at random in the collections, although no significant damage by them has been experienced.

There has not been any further progress in the amalgamation of the Society's Microlepidoptera into a single collection that began in 2007, and the Pyralidae and Tortricidae remain to be arranged. Work on this has been suspended pending the appearance of a new checklist of British Lepidoptera. When that is published, consideration will be given to whether reorganisation of the entire Lepidoptera collection, according to this list, will be feasible.

It was mentioned in last year's report that a 12-drawer cabinet is available for sale to members. No interest has yet been shown in this cabinet, which is also now advertised on the Society's website, for which I thank Tony Pickles. This cabinet is not in perfect condition and has shallow drawers that require repapering, so a large sum for its purchase is not anticipated. Members interested in purchasing this cabinet should view it at the Society's building, and the first reasonable offer received will be accepted.

As mentioned in previous years there is still a large number of unnamed micro-moths, mostly in store boxes and identified to family level. Any assistance with these by specialists would be appreciated.

I am grateful to Ivan Perry for a further significant donation of Diptera to the Society's collection. Donations were also received from Tony Pickles (European moths), Mark Mitchell (Diptera), Richard Dickson and Jim Flanagan (both micro-moths).

PETER CHANDLER

LIBRARIAN'S REPORT

What a year 2012 has been! The library has been completely re-decorated, and now all the cracks in the walls have been filled and the exposed wall surfaces, woodwork and the ceiling have been painted. In addition to all this, we now have 3.2m³ of cupboard storage space, enabling all the rare books and the Societies' historical obligations books and minutes of meetings, previously housed in the old wooden book cases which were sold last year, to be stored more securely. One glass-fronted cupboard is being used to house our New Naturalist series and our new publications that are on sale to members (Fig. 1).

As part of this refurbishment 56.5 metres of new shelving for journals and books have been added to the walls and islands. This has enabled our separates and short-run journals to be allocated some dedicated shelf space, while the modification of one existing bay of shelving has added 50% to the space allocated for the display of new journals. All told, this re-fit should "future-proof" our library from requiring additional work for the next 50 years or more! It has not been easy, but I hope all who make use of it will agree that it was well worth the effort. Jon Cole has been instrumental in assisting with this refurbishment and I would like to extend my grateful thanks to him for his help and encouragement.

The Howarth Room has also benefitted from the purchase of some lockable metal storage cupboards, in total, 4.7m³ of space has been provided for the storage of our new publications. Another glass-fronted display cupboard is also located in this room, and houses the Simpson Collection of Entomological Memorabilia.



Figure 1. Some of the new cupboards and shelving purchased to replace the old wooden cupboards that were disposed of last year (note new door to Howarth Room in the background). Picture courtesy of Jon Cole.

Even with all this refurbishment work, some new books were ordered throughout the year as interesting titles became available.

Surprisingly the two missing old blue Library Loans books, referred to in last years' report, mysteriously re-appeared about half way through this year so I am grateful to the person who borrowed them for their return.

In conclusion, I would now like to thank Michael Archer, Peter Chandler, Una Colyford, Alan Dawson, Roger Hawkins, Jim O'Connor and Adrian Plant for donations of books and/or journals during the past year.

IAN SIMS

PRESIDENTIAL ADDRESS PART 1: REPORT

GLENDAM. ORLEDGE

*Department of Biology and Biochemistry, University of Bath,
Claverton Down, Bath BA2 7AY*

As a consequence of the extension of Tony Pickles' presidency, I am addressing you as a President who is already in office, and will remain so for the next year.

This allows me the unique opportunity not only to reflect on our Society during the past 12 months, but also to look forward, albeit briefly, to the remaining part of my presidency. Of course, some of what I shall say is on behalf of both Tony and myself. But before I go any further I would like to thank Tony most sincerely, and on behalf of us all, for everything he has done for our Society during his presidency and for what he continues to do. Thank you very much, Tony.

Looking back over the last 12 months on behalf of us both there is no time to include all of the noteworthy things that have happened; so I have picked out just four of them.

Firstly, there is the completion and formal opening of the Graham and Helen Howarth room. This room is an excellent addition to our facilities at Dinton Pastures, and will allow us not only to expand Society activities but also to extend greater hospitality to our affiliated groups and the wider entomological community.

Secondly, and linked to this, is the provision of additional cupboards and shelving in the library and Howarths' Room. This work has been overseen by Ian Sims, and he richly deserves our thanks for the time and effort he has given to this. We now have the increased storage space we need, improved library shelving and newly-painted walls; and it looks very good indeed.

Thirdly, we took the difficult decision to move our Annual Exhibition away from Imperial College. Our hand was forced by the escalating cost of hiring Sherfield Hall, and this year our Annual Exhibition will be held at Kempton Park Race Course on November 16th. Council has asked for members' comments, and I do urge any members who have not already done so to let us have their thoughts on this venue. Council needs to be sure that it is making decisions about this major date in the Society's calendar that will be welcomed by as many members as possible.

Fourthly, our decision to assist the Bug Club represents a tangible way of supporting and encouraging young people who would like to find out more about insects and the natural world that both they, and we, inhabit. That we are able to give support to young people in this way gives me, personally, great pleasure and satisfaction, and is something I shall mention again in a moment.

Of course none of this would have been possible without members of Council, Society Officers and our ordinary membership who individually have done so much, and collectively have enabled our Society to complete yet another successful year as a leading entomological and natural history society in the UK. On your behalf I thank them all and record a particular vote of thanks to Jon Cole. Jon has been an ever willing tower of strength in assisting our Building Manager, Martin Albertini, who has been unwell this year.

As you have already heard in Council's report, poor health has meant that Ian McLean has had to step down from Society Office. Ian has served the Society for a quarter of a century with characteristic tact, diplomacy and common sense. He was our President in 1988. Since then he has served on Council almost continuously and

has filled many roles. He joined the publications committee in 1989 and became its chairman in 1998. He became Indoor Meetings Secretary in 1992 and Laternist in 1996. He has continued in all of these roles until now. Ian oversaw the production of the Society's *British Soldierflies*, the second edition of *British Hoverflies* and, most recently, *British Plume Moths*. Up until 2003, when we held meetings at the Royal Entomological Society's rooms in South Kensington, Ian not only arranged the lectures but also set up and operated the projector. Although, unlike the Victorian Lanternists, he did not have to produce the acetylene gas he was, nevertheless, very protective of the title 'Lanternist' in spite of attempts by 'modernists' to change the name of the post. When the Society moved to Dinton Pastures, Ian was instrumental in setting up and organising the workshop meetings, Coleopterists Day and regional meetings. These have all been very successful ventures.

We owe Ian an enormous debt of gratitude. We all wish him well, and hope that he will be able to pursue some things entomological this year.

It is always a pleasure to be able to say thank you. It has also been my pleasure to inform five of our members who have completed 50 years with our Society, that they have been elected to Special Life membership. One of these, our custodial trustee of 30 years' standing Derek Stimpson, tells me that he has happy memories of 'field meetings when it was always sunny'!

Sadly, seven members have died since our last AGM and they include two past Presidents.

C. E. (Peter) Dyte joined the Society in 1986 and had a particular interest in Diptera.

Special Life Member Eric Groves joined in 1956. Interested in ecology, his entomological interests focused on the Heteroptera and Diptera.

Charles David died suddenly in September. He joined the Society in 1997 and I daresay that many of you share my memories of a very kind and knowledgeable man. He made a significant contribution to biological recording on Guernsey, and his enthusiasm was boundless.

Paul Sokoloff died in November. A lepidopterist who joined the Society in 1971, Paul served as our president in 1984. He was a contributing author to *A Field Guide to the Smaller Lepidoptera* and wrote many articles on the microlepidoptera. His most recent talk to our society was at the regional meeting in Kent in 2011.

Bath resident Jean Matthews joined our society in 1971. Her main entomological interest was the Lepidoptera.

Eric Philp died in January. A member of our Society since 1969, he was a true natural historian, a fantastic all-round naturalist, who gave willingly of his time and knowledge to so many of us. Eric served as our President in 2000, and as Chairman of our affiliated group, British Myriapod Isopod Group, for several years. He was keeper of Natural History at Maidstone Museum for 35 years and a former President and Honorary Member of the Kent Field Club.

Bristol resident Barry Harper died in early March. He joined our Society in 1985 and had a particular interest in the Lepidoptera.

Also, Eileen Thorpe, a knowledgeable naturalist and dipterist, who joined our Society in 1986, died in February last year. I mention her now because we became aware of her death only after Tony Pickles had delivered his AGM address to you last year.

I invite you all to stand for a minute in memory of these and all our late members.

To conclude, I would like to take a brief look ahead. In doing so, I am conscious that my role as your President is to steer our Society forward on a steady course during the next 12 months. It must continue to develop in a rapidly changing world,

but we must ensure that it retains the principles and values that are fundamental to its identity.

One of the things that we are all aware of is the dearth of new and young natural historians, and entomologists in particular. As A-level and Higher Education students receive less and less whole organism teaching, our Society becomes more and more important. We need to recognise this increasing importance and the responsibility we have to use our knowledge and expertise to reach out to those students with an interest in the natural world. We must pass on to them our skills and our passion for contributing to a better understanding of nature.

In an attempt to do this we have a special weekend meeting on collecting and recording insects at the University of Bath this April. One of the immediate spin-offs will be a list of campus records that can be used for teaching. Pleasingly, many members are lending their expertise and support to this and 28 enthusiastic students have already signed up to join the meeting. Let us hope we can inspire some of them to develop a serious interest in entomology and to take advantage of what we can offer them in this respect.

We can also use our combined field expertise to help in other ways, and enjoy ourselves in the process. In July next year we are meeting on Lundy to update the island's invertebrate records. Moreover, the plan is to deposit voucher specimens from this survey in our collections, thus creating a valuable reference collection for the island. Lundy is a wonderful place to visit and, not surprisingly, this looks as though it will be a well-attended meeting.

Many of us, and I am one of them, choose not to have our lives dominated by all things electronic. However we would be unwise to ignore modern technology and the benefits that this can bring to our Society. Tony Pritchard already does an excellent job of looking after our website. He now heads a support group of Council members which will assist him as necessary and consider ways of developing our website.

It just remains for me to say that it is a great honour for me to be here as your President. I will do my very best to serve you well. Thank you.

SHORT COMMUNICATION

***Chloriona vasconica* Ribaut (Hemiptera: Delphacidae) in Middlesex (VC21).** – On 25th June 2013, I visited a *Phragmites* reed bed which is partially flooded in Home Park, Hampton Court, Middlesex (TQ1768). Macropterous male, and bright green micropterous female *Chloriona* were abundant. Of ten males checked microscopically, all proved to be fully winged *C. vasconica*, the first for VC21. Graham Collins took this local species in a Malaise trap, over the Thames in Richmond Park in 2003, but this appears to be only the second record from Greater London. – JONTY DENTON, 31 Thorn Lane, Four Marks, Hants GU34 5BX

OBITUARY

DONALD ARTHUR HUMPHREY
1921–2012

Don Humphrey passed away on the 19th December 2012 aged 91. He was born in Sittingbourne, Kent. His main interest was in birds and with friend David Brown they combined their large egg collection which was acquired before it was illegal to collect eggs. It was most impressive and meticulously displayed and was eventually presented to Edinburgh Museum.

Don later moved to Ferndown in Dorset and he and his brother ran a Bicycle shop in Wallisdown for many years. In the 1980s he became interested in butterflies and regularly looked for varieties of the Chalkhill Blue *Lysandra coridon*. He always visited a little known colony near Salisbury in Wiltshire which proved to be a happy hunting ground and he showed some fine aberrations of this species of butterfly at the Society's Annual Exhibitions. He joined the BENHS in 1993 and around that time he and Una drove to Scotland to see Chequered Skipper *Carterocephalus palaemon*, they were successful in spite of bad weather.

I introduced Don to moths and he became very enthusiastic and enjoyed numerous sessions with MV traps and visited nearby Bere Wood, Martin Down, Piddles Wood, Powerstock Common and of course the New Forest and the Purbecks. He discovered a small colony of Five-spot Burnet *Zygaena trifolii* f. *decreta* at West Moors where it still thrives today. Don brought a lot of enthusiasm to a mothing outing and was a good companion in the field.

Don and Una were keen on their modern sequence dancing and always went twice a week to dance sessions. He was also keen on his garden and was very good at growing vegetables: neighbours and friends always came home with a bagful when they paid a visit.

Don was very handy and was always ready to help friends and neighbours, he will be sadly missed, and we send Una our condolences.

RAYMOND COOK

SHORT COMMUNICATION

An interesting record of *Passaloecus gracilis* (Curtis) (Hymenoptera: Crabronidae) and *Pseudomalus auratus* (L.) (Hymenoptera: Chrysididae) associated with a gall of *Diplolepis rosae* (L.) (Hymenoptera: Cynipidae). – On 30.iii.2011 three galls of *Diplolepis rosae* were collected from a *Rosa* sp. bush at Grain, Kent TQ8976. The galls were retained, enclosed together, in a well ventilated and shaded garden shed. On 29.v.2011 two female *Passaloecus gracilis* emerged and these were followed by another female on 2.vi.2011. On 8.vi.2011 a female *Pseudomalus auratus* emerged. The *P. gracilis* specimens were identified by reference to Yeo & Corbet (1983) and the *P. auratus* specimen was identified by reference to Morgan (1984). The specimens were also compared with specimens available at the Angela Marmont Centre for UK Biodiversity at the Natural History Museum.

Passaloecus gracilis is known to nest in beetle burrows in dead wood and in pithy stems or in the burrows of *Rhyacionia* (Lep.: Tortricidae). *Pseudomalus auratus* is known to be a cleptoparasite of *Passaloecus* species. Both are fairly common in Kent (Allen, 2009, *Bees, wasps and ants of Kent*).

The three galls of *Diplolepis rosae* also produced specimens of *Diplolepis rosae*, *Torymus bedeguaris* (L.) and *Glyphomerus stigma* (F.) (Hymenoptera: Torymidae) in

June and July. The latter two are both associated with *D. rosae*. After the emergence of all of the species the galls were examined and dissected in an attempt to find the cells of *P. gracilis*. Unfortunately neither the stem sections within the gall nor the gall matrix itself provided positive evidence of use by *P. gracilis*. Females of *D. rosae* begin to lay eggs in late June and small fresh galls can be found from mid July onwards. It would be interesting to know the sequence of events that produced the association between the *D. rosae* gall and *P. gracilis*.

I thank the staff at the Angela Marmont Centre for providing me with the opportunity to view the specimens of *P. gracilis* and *P. auratus*. – M. T. JENNINGS, 206 Lower Higham Road, Gravesend, Kent DA12 2NN

REFERENCES

- Morgan, D. 1984. Cuckoo wasps (Chrysididae). *Handbooks for the Identification of British Insects Volume 6 Part 5*. Royal Entomological Society.
 Yeo, P. F. & Corbet, S. 1983. *Solitary Wasps, Naturalists' Handbooks 3*. Cambridge University Press.

BOOK REVIEW

The Beekeeper's Handbook, Fourth Edition by Diana Sammataro & Alphonse Avitabile. (Comstock Publishing Associates, Cornell University Press, 2011). 308pp. Softback £19.95. ISBN 978-0-8014-7694-5.

There is a reasonable case for believing that the honeybee *Apis mellifera* L. is native species to the British Isles. Most of the strains in commercial use today are of hybrid origin and it is these we encounter most frequently in the field. Many field entomologists do not record *A. mellifera* for this very reason. However many new colonies of the bee are established in the wild each year on a semi-permanent basis and so form an integral part of our wildlife. We should record their presence for the simple reason that the honeybee is a major ecosystem provider, pollinating many of our native wild flowers. Keeping honeybees however, requires a commitment beyond being an entomologist: a lot of work is involved.

Since the publication of the first edition of the handbook in 1973, many thousands of novice and experienced beekeepers have relied on this book as the preferred single-volume guide to bee keeping. Featuring clear descriptions and authoritative content, this handbook provides step-by-step directions accompanied by more than 100 illustrations for setting up an apiary, handling honeybees, and working throughout the season to maintain a healthy colony of bees and a generous supply of honey. Chapters explain the various colony care options and techniques, citing their advantages and disadvantages, so that beekeepers can make the best choices for their own hives.

The fourth edition has been redesigned, revised and expanded to incorporate the latest findings on Colony Collapse Disorder, green integrated pest management techniques, overwintering protocols and ways to control bee mites. In recent years honeybees appear to be doing rather better in urban surroundings than in agricultural environments, mainly because gardeners provide a more round-the year supply of flowers that are attractive to bees. So, if you live in a town there is no better time than the present to begin beekeeping: this book offers plenty of sound advice.

JOHN BADMIN

FIELD MEETINGS

Borough Fen Duck Decoy, Newborough, near Peterborough, Cambridgeshire, 25–26 June 2011

Leader: **Paul Waring**. – This meeting was a return visit by the BENHS to the Borough Fen Duck Decoy which the late Peter Scott, Rick Pilcher and latterly Tony Cook have been instrumental in saving and maintaining as a working duck decoy. An introduction to the site, its history as a decoy since 1670, and the leader's involvement with it were given in the report of the first BENHS field meeting, on 15 May 2010 (see *BJENH* 26: 55–58).

This field meeting at the Decoy was a joy in that the weather conditions on the night were favourable and decent catches of moths were obtained. This was in marked contrast to the field meeting led by the same leader the previous weekend (18 June) in Bernwood Forest, Buckinghamshire, in which there was prolonged rain during the day and the dusk temperature was only 12°C, with depressed catches as a result. Here at the Decoy we enjoyed 19°C at dusk, a night minimum of 17°C, and it was dry by day and night, with almost 100% cloud cover once darkness fell. But although moth numbers were up, attendance was down. No other BENHS members joined the leader for this night meeting. In addition, key local moth-trappers with portable light-trapping equipment were unavailable due to prior commitments. Three of us slept out on the site overnight and the only light-traps operated were those provided by the leader (Fig. 1). These comprised a standard-pattern Robinson trap fitted with a 125W MB/U mercury vapour bulb, operated from a 240V



Fig. 1. View from boathouse into the lake at Borough Fen Decoy, Newborough, 25th June 2011, showing the marginal vegetation. Photo: Paul Waring.

generator, and a Professional model Heath trap fitted with a vertical 6W actinic fluorescent tube, white vanes, and operated from a 12V car battery. Both traps were operated all night from before dusk until after dawn and inspected soon after day-break. The Robinson trap was situated in a grassy clearing near the entrance to the site and by the tool shed in which we slept. This clearing is surrounded and sheltered by trees – mostly ash and poplars, with an understorey predominantly of hazel, blackthorn and holly. The global positioning co-ordinates of this trap were N52°39'26.6" W000°13'42.6" as measured by a Garmin 60CS× unit. The total catch of macro-moths in the trap in the morning was a pleasing 256 individuals of 55 species. There were no national rarities in the catch – a single Cream-bordered Green Pea *Earias clorana* (L.) being of greatest interest in this context. This formerly Nationally Scarce species has been recorded just 2km away, in the leader's garden in Werrington, on a fairly regular basis since the leader moved there in 1991 and it is certainly now resident rather widely in this general area. Species worthy of note in that they are far from ubiquitous in the area included the Figure of Eighty *Tethea ocellaris octogesimea* (Hübner) 6, Treble Brown-spot *Idaea trigeminata* (Haw.) 2, Large Twin-spot Carpet *Xanthorhoe quadrifasciata* (Clerck) 3, Barred Straw *Eulithis pyraliata* (D. & S.) 5, Rivulet *Perizoma affinitata* (Steph.) 1, Sandy Carpet *Perizoma flavofasciata* (Thunb.) 1, Twin-spot Carpet *Perizoma didymata* (L.) 1, Gothic *Naenia typica* (L.) 1, Broad-barred White *Hecatera bicolorata* (Hufn.) 1, Coronet *Craniophora ligustri* (D. & S.) 5, Large Nutmeg *Apamea anceps* (D. & S.) 13, and also the reed-dependent pyralid moth *Chilo phragmitella* (Hübner) 1.

The actinic trap was placed deeper into the woodland under a tree canopy mainly of Ash and poplars, at N52°39'26.3" W000°13'40.3". This trap captured 79 macro-moths of 26 species. Of the above species it captured Treble Brown-spot 1, Rivulet 1, Broad-barred White 1 and Coronet 3. The species recorded which were not seen in the Robinson trap included Coxcomb Prominent *Ptilodon capucina* (L.) 1, Double-striped Pug *Gymnoscelis rufifasciata* (Haw.) 1, Silver-ground Carpet *Xanthorhoe montanata* (D. & S.) 1 and a Wax moth *Galleria mellonella* L.

The most numerous species of the night, occurring in double figures in one or other trap and showing the numbers in the Robinson trap and the Heath trap respectively, were the Double Square-spot *Xestia triangulum* (Hufn.) (41, 35), Uncertain *Hoplodrina alsines* (Brahm) (38, 4), Common Footman *Eilema lurideola* (Zinck.) (12, 7), Flame *Axylia putris* (L.) (18, 0), Snout *Hypena proboscidalis* (L.) (13, 1) and Large Nutmeg *Apamea anceps* (D. & S.) (13, 0).

The leader would like to thank Kirsty Waring and Shona Buckley for the fine night of camping, exploring the Decoy and having breakfast by the traps, the owners of the Decoy (Ann and Rodney Fletcher) and the site manager (Ivan Newton) for permission and facilitation of this meeting.

Hogmoor Inclosure, Whitehill, Bordon, Hampshire, 23 July 2011

Leader: Stephen Miles. – Permission was obtained from the site owners, the Ministry of Defence, once again for this the fourth consecutive year of a moth trapping field meeting organised by the leader on this site. The main area chosen for the use of light traps was 300m east of the site's western edge, within a small area of open heather, in the same area used for the previous three meetings.

The site comprises heathland with deciduous and coniferous woodland and scrub, and is also a local Site of Interest to Nature Conservation (SINC). It is currently an Army tracked-vehicle training site but as Bordon is the subject location for an awful, so-called eco-town, it is threatened by house building development encroachment

and now a new road on its eastern edge despite its SINC status. Its future is to be that of a Suitable Alternative Natural Greenspace (SANG) for free-running dogs, so that hopefully they and their owners come here rather than damaging the European designated Special Protection Areas (SPA) of heathland that surround Bordon. The meeting was organised as a joint meeting of the Alton Natural History Society (ANHS) and the British Entomological and Natural History Society (BENHS). The purpose was to obtain more site species information for the Local Biodiversity Action Plan (LBAP). This LBAP is updated annually with the results from these meetings. Fortunately, once again, it was a dry and warm evening.

Cherry Cray was the only member of the Alton Natural History Society besides the leader to turn up and she kindly helped the leader with boxing incoming moths to the leader's trap while he was visiting other people's trapping sites. Three other local moth enthusiasts, Andy James, Denise Murray and Bill Wain also attended with three BENHS members beside the leader, namely Tony Dobson, Norman Binsted and Mark and Elizabeth Trasenster. So for these meetings this was another good attendance and enabled two actinic lights and five MV traps to be run.

In all 86 species of moths were recorded. From his total of 18 species that visited his MV trap, situated under mature Scots pine trees surrounded by open heather, Norman Binsted recorded 12 more species than the leader Stephen Miles. Mr Binsted was fortunate to trap two specimens of the dark form of the Annulet, *Charissa obscurata* (D. & S.), which was last recorded in this vicinity by David Wright in the 1950s, as well as the common Slender Brindle, *Apamea scolopacina* (Esper), which was new to the site. Stephen Miles recorded 23 moth species either in his actinic trap or as visitors to the sheet, both situated under a mixed tree canopy at the side of a ride. These included one specimen each of Privet, Poplar and Pine Hawk moths and another four of the last species were taken amongst all the other traps on the night, but no rare or local species. Tony Dobson noted 29 additional species that were not present in either the leader's or Norman Binsted's traps using a small, low power actinic trap amongst the open heather and his MV trap situated beside a ride edge. Denise Murray and Andy James recorded seven species and Mr Trasenster eleven species unique to their traps.

Amongst his significant results Tony confirmed by genitalia dissection that the Grey Dagger *Acronicta psi* (L.) still occurs here, as it had done in the 1950s, he also recorded a specimen of the micromoth, *Pseudatemelia josephinae* (Toll) in his actinic trap, which as a larva occupies a portable case and eats leaf litter. This is the first record of this moth for the SU7834 tetrad and 10km square for this area of north-east Hampshire. A specimen was previously recorded in 2007 at Odiham in north Hampshire. Mr Dobson also recorded the following micromoths believed to be new to the SU7834 tetrad: *Paraswammerdamia nebulella* (Haworth), *Scrobipalpa costella* (Humphreys & Westwood), *Anarsia spartiella* (Schrank). He also recorded a specimen of the pyralid *Pediasia contaminella* (Hübner), which according to the Hampshire Moths web-site is another notable species; this has been recorded before in the Whitehill area, in 1995. He also had a hand in determining two specimens of the macromoth, the Dotted Border Wave, *Idaea sylvestraria* (Hübner) from Andy James' MV trap in the open heathland, as well as having one specimen of this notable heathland moth at his own actinic trap situated in the same habitat and area. *Scoparia pyralella* (D. & S.) and the Red-barred Tortrix, *Ditula angustoriana* (Haworth) were also recorded in Mr James' trap; both are recorded here as new to the site. Mr Dobson also identified specimens of *Dipleurina lacustrata* (Panzer) and *Scoparia subfusca* Haworth on the leader's sheet, which were again new to the site.

Old records of common moth species such as the Small Fan-footed Wave, Common Carpet and Drinker moths listed by Mr Wright in the 1950s were reconfirmed by Mr Transenster. A number of micros new to the site were also recorded by Mr Transenster as follows: *Hedya salicella* (L.), *Eucosma cana* (Haworth), *Gypsonoma sociana* (Haworth), *Epagoge grotiana* (F.) and *Pammene aurita* Razowski, the last species being new to the SU7834 tetrad. He also recorded the notable species *Synaphe punctalis* (F.), which is also new to this site and tetrad.

For the post-2008 period 24 of the moth species taken or observed on this night were new to the site. For permission to hold this meeting thanks go to the Chairman of the Longmoor Conservation Group, representing the Defence Infrastructure Organisation.

National Moth Night, Borough Fen Duck Decoy, Newborough, near Peterborough, Cambridgeshire, 22–23 June 2012

Leader: **Paul Waring**. – National Moth Night was extended to a three-day period in 2012, from 21–23 June, to reduce the risk of efforts being hampered by bad weather. However the forecast for the three day period was so poor that support for this national occasion was very subdued and some events were called off completely. Three months of wet weather and much lower than average light-trap catches in 2012 seemed to be grinding a lot of people down! There was in fact widespread flash-flooding, and there are also only so many wet nights that you can take in a row. After what seems like a long run of years when the weather on National Moth Night itself has been poor, even in quite good seasons, and despite it being held on varying dates throughout the summer months, I had scaled down my ambitions to a local trapping session that did not require much effort on my part. I decided to mark National Moth Night by leading the third BENHS field meeting at Borough Fen Decoy on this night. Reports of previous BENHS field meetings at this site are covered in *BJENH* 26: 55–58, 173–174.

Despite the stay-at-home attitudes around me owing to the weather, I forged ahead with this third BENHS field meeting at the Decoy and here's how it went. I selected Friday 22nd June as the best of the three nights on offer weather-wise. I operated the standard-pattern Robinson trap with 125W MB/U bulb which I run every week in my garden to provide my baseline catch for evaluating the night. I had obtained permission to operate in the privately-owned Borough Fen Duck Decoy, just a 2km drive to the east of where I live, in the extreme east of the Soke of Peterborough and vice-county Northamptonshire. This is a part of the county for which the County Moth Recorder receives very few records apart from my own. As described in previous reports, the site is also an oasis of wooded and lake-edge habitat in a sea of intensively-farmed flat agricultural land. Having originally intended to take out a couple of Robinson traps and a generator and sleep out on site to operate the traps all night, as in 2011, the pitiful catches at home that week persuaded me to take out just a professional model 6W actinic Heath trap with an original red-eye photocell and a DC to genuine AC conversion unit and to leave it on site to switch itself on and off unattended on a car battery. We had just installed solar panels at home and I found I was able to charge the battery from the sun, no matter how feeble. It was a very windy night, but under the big poplar trees at TF 19953 08084 $\pm$ 6m at the Decoy the trap was both sheltered from the wind and shaded from any sun in the early morning (Fig. 1). We left the trap to do its best and next morning, my wife, our daughter and I returned with our breakfast to eat it round the trap. The catch was only 13 macro-moths of 8 species, but this seemed relatively



Fig. 1. Actinic Heath trap at Borough Fen Decoy, Newborough, 22nd June 2012. Photo: Paul Waring.

good considering the generally poor results with bigger traps at this time. For comparison, the catch in my garden Robinson trap was 39 macro-moths but 27 of these were the Heart & Dart *Agrotis exclamatoris* (L.). The remainder of the moths were few in number and so are listed here; Peppered Moth *Biston betularia* (L.) 2, Mottled Beauty *Alcis repandata* (L.) 1, Flame *Axylia putris* (L.) 1, Uncertain *Hoplodrina alsines* (Brahm) 1 (the first of the year of this abundant species here), Vine's Rustic *Hoplodrina ambigua* (D. & S.) 4, Dark Arches *Apamea monoglypha* (Hufn.) 2 and Brown Rustic *Rusina ferruginea* (Esper) 1. The air temperatures at dusk and at night minimum as recorded beside this trap were 15°C and 11°C, respectively.

There was a Poplar Hawk *Laothoe populi* (L.) in the catch at the Decoy, which was good for the show, and a Treble Brown-spot *Idaea trigeminata* (Haw.), which has become a more frequent species in this area in recent years. The remainder of the moths were few in number and so are listed here: Common Swift *Hepialus lupulinus* (L.) 2, Garden Carpet *Xanthorrhoe fluctuata* (L.) 1, Mottled Beauty 1, Coxcomb Prominent *Ptilodon capucina* (L.) 1, Flame 2, Ingrailed Clay *Diarsia mendica* (F.) 1 and Brown Rustic. All of the species seen have also been recorded in the leader's garden, except the Ingrailed Clay, but at least we had supported National Moth Night and not cried off!

Stoke Saltings, Middle Stoke, Isle of Grain, Kent, 1 July 2012

Leader: **John Badmin**. – This was another joint meeting between members of the Kent Field Club and the British Entomological and Natural History Society. Six

people turned up to brave the elements, Dom Collins having come from as far away as Yorkshire. It was a nice, remarkably sunny day for 2011, but with a keen southerly wind which kept blowing showers across the countryside. We had a magnificent view across the Medway estuary and the North Downs beyond, and it was not too surprising that we should eventually fall foul to a heavy rainstorm ourselves, around lunchtime, which more or less brought entomological field work to a close. The meeting place, Stoke Airfield, is right beside the sea wall on the western side of the Medway estuary and consists of a short, grassy airstrip for flying microlites, autogyros and small light aircraft. I would like to have shown members a photograph of what the saltings look like from a microlite 50m above, but when I was up there I was too busy gripping tightly onto the pilot in front of me (nothing else to hold onto, except the main fuel tap to the engine which I was told NOT to touch under any circumstances), and when I was allowed to fly the machine I immediately put it into a nose dive which increased my heart rate no end. Still, I do recommend everyone should try flying in a microlite once – if only to admire the green and blue fractal landscape below. Various aircraft were in operation despite the gusty conditions and dived down to see what we were up to (Fig. 1).

Ron Carr beavered away on the saltings and was pleased to record the staphylinids *Bledius spectabilis* Kraatz (= *B. limicola*) and *Tasgius ater* (Gravenhorst) and the carabid *Dichierotrichus gustavii* Crotch, all characteristic inhabitants of saltmarshes (Fig. 2). He had more success finding beetles in a small lagoon behind the sea wall, recording *Haliphus immaculatus* Gerhardt, *H. ruficollis* (De Geer), *Noterus clavicornis* (De Geer), *Hygrotus inaequalis* (F.), *Laccobius bipunctatus* (F.), *Anacaena limbata* (F.) and *Drypos luridus* (Erichson). Two more locally important finds were



Fig. 1. A gyrocopter taking off from Stoke airfield, Isle of Grain, 2012.



Fig. 2. Grant Hazlehurst and Ron Carr, Stoke Saltings, looking east across the Medway estuary, 2012.

Hydrochus ignicollis Motschulsky (RDB3) and *Enochrus halophilus* (Bedel). He also recorded the corixid bug *Sigara falleni* (Fieber).

Dom Collins noted that the thrips fauna was pretty standard for a southern English location dominated by varied grasses and associated sparse flora. His list included common grass species such as *Anaphothrips obscurus* (Müller), *Aptinothrips rufus* Haliday, and *Chirothrips manicatus* Haliday, as well as common and widespread polyphagous species such as *Frankliniella intonsa* (Trybom), *Thrips angusticeps* Uzel, and *Thrips tabaci* Lindeman. Also common at the site was the facultative predator *Aeolothrips intermedius* Bagnall and the florivore *Melanthrips fuscus* (Sulzer). The hypothesis, put forward after a previous field meeting, that *Haplothrips hukkineni* Priesner (tube length 98–130µm) is likely to be more widely distributed around the south east coast of England than previously suspected (Collins, 2012) is strengthened by the presence of two adult females and two adult males taken amongst larger numbers of *Haplothrips juncorum* Bagnall from a clump of sea club-rush (*Bolboschoenus maritimus*). This is only the third confirmed site in Britain (and the most northerly) from which *H. hukkineni* has been recorded.

Brian Woodhams compiled a reasonable list of vascular plants, perhaps the best being a large patch of local sea clover *Trifolium squamosum*, previously recorded from here in the 1982 Flora. Despite the abundance of clover flowers mixed in with grass vetchling *Lathyrus nissolia* and spiny restharrow *Ononis spinosa*, bumblebees were difficult to spot. *Bombus pascuorum* (Scopoli) was seen together with a few workers of *B. terrestris/lucorum* (L.).

Laurence Clemons managed to provide a reasonable list of Diptera (36 species in total) despite the far from ideal conditions, the wind being a little too strong for

many small insects to fly or sun themselves. He noted the chloropids *Chlorops hypostigma* Meigen, *Dicraeus fennicus* Duda, *Incertella albipalpis* (Meigen) and *Thaumatomyia glabra* (Meigen) and the coastal soldier fly *Nemotelus uliginosus* (L.). Picture-winged flies, his favourite group were present, two in reasonable numbers. Those noted were: *Urophora stylata* (F.) (hostplant thistles), *Campiglossa plantaginis* (Haliday) (hostplant sea aster), *C. misella* (Loew) (*Artemisia* sp.) and *Myopites eximius* Séguy (hostplant sea samphire). The last-named fly is mainly confined to *Inula crithmoides*, a rather local plant along the coasts of Britain and parts of mainland Europe, with most fly populations known from the UK, and yet surprisingly it is apparently not yet considered a species of conservation concern.

Other fly species characteristic of Kent's northern fringing saltmarshes were the ulidiid *Melieria picta* (Meigen) associated with sea club-rush and the scathophagid *Scathophaga litorea* (Fallén). However the most exciting dipteran find was the discovery of two fly species new to Kent, the anthomyiid *Botanophila depressa* (Stein) and the chironomid midge *Nanocladius dichromus* (Keiffer).

The leader confined himself to recording Hemiptera and was pleased to note extremely high numbers of the saltmarsh cixiid *Pentastiridius leporinus* (L.) which is otherwise quite local in Kent. Clumps of sea wormwood were present all along the saltmarsh edge but only two nymphs of the BAP leafhopper *Chlorita viridula* (Fallén) were found in one patch despite intensive searching. The timing of the visit may have been a little too early in the season as a result of the poor weather as it was hoped to extend the distribution of the *Spartina* planthopper *Prokelisia marginata* (Van Duzee) along the Medway, but to no avail (the species was recorded in an adjoining tetrad in 2011). Ten hopper species in all were recorded, including the saltmarsh leafhopper *Psammotettix putoni* (Then), a rather low total. Several nymphs of Roesel's bush-cricket *Metrioptera roeselii* (Hagenbach) and the blue-tailed damselfly *Ischnura elegans* (Vander Linden) were found amongst the reeds.

We all discussed the general paucity of insects as we should have recorded more species than we did. This was best exemplified by recording only a few individuals of a single butterfly species, the 'ubiquitous' meadow brown and just a single hoverfly *Episyrphus balteatus* (De Geer).

The meeting ended with a hot cuppa and sandwich in the airfield's club house and a chat with the pilots who had dive-bombed us just to see what we were doing with our nets. The leader wishes to thank Stoke airfield for allowing us to park at the airfield and to use their facilities.

If all goes badly in the near future, the saltings will be destroyed and will form part of the outer area of the new London Airport facility proposed by Foster & Partners (see Fig. 3, for artist's impression). The Stoke saltings represent some of the largest and best developed salt marsh communities in the Medway estuary and north Kent, comprising fringing saltmarsh and a series of small and large outer saltmarsh islands. The lower reaches are especially rich in glassworts – *Salicornia perennis*, *S. pusilla*, *S. ramosissima*, *S. europaea*, *S. fragilis* and *S. dolichostachys* and show just how varied the plant communities are (Philp, 2010). The area forms an important link with other saltmarshes in the vicinity, both on the same side of the estuary and more importantly across the Medway to Chetney Marshes (an avocet reserve) and thence to the extensive saltmarshes of Sheppey and south Swale. The continuation of these large extensive tracts of saltmarsh is integral to maintaining links between these sites. The area is also well known for its rich avian wader fauna. Building the airport would certainly be detrimental to the long term viability of Kent's saltmarshes and continue the gradual process of isolation from similar habitats across the Thames in Essex. The isolation and degradation of saltmarshes higher up the Thames estuary



Fig.3. Foster & Partners' impression of what the Thames estuary airport would look like.

has for example already led to the loss of characteristic species such as the ground lackey moth *Malacosoma castrensis* (L.) which requires a metapopulation structure to survive large fluctuations in numbers brought about mainly by egg parasitism (Badmin, *pers. observ.*).

It is known that strong fliers such as the bumblebees and RDB shrill carder bee *Bombus sylvarum* (L.) in particular are able to cross the river Thames near London and maintain larger, more viable populations as a result. The imposition of a huge airport on Grain would lead to serious habitat loss and habitat fragmentation in this general region and probably restriction of this bumblebee to a much smaller area further east along the Kent coast. Another strong flier, the RDB3 horsefly *Atylotus latistriatus* (Brauer), restricted to saltmarshes in the south-east is another candidate that might be affected. It can be found far from land in the Medway estuary but may be prevented from reaching Essex or moving freely between saltmarshes by a big patch of inhospitable habitat such as the managed tarmac runways and extensive buildings of the proposed airport. Many more insect species with a coastal distribution are likely to be similarly affected. The size of the proposed airport would also seriously alter the balance of the existing Kent landscape effectively splitting the region into two separate areas with minimum movement of species between. The saltmarshes to the east would be effectively reduced by c. 20% in extent from which they might never recover.

The list of local/RDB insects, including two fly species new to Kent from just a couple of visits indicates the area supports a rich coastal invertebrate fauna in addition to a rich variety of plants. Each region of the UK has a distinct fauna and flora and this applies here, but how unique it is, and should it therefore be protected, is a much more difficult question to answer. There is a suite of 'Thames estuary'

species that deserve protection (J. C. Felton, *pers. comm.*). It is interesting that we place increasing emphasis on mapping (insect) species distributions in order to better understand their status but spend little time investigating their biology as living creatures. We might know that a species is an inhabitant of coastal areas but we have little or no idea how such species behave and disperse in the wider landscape. For example how far do coastal moth species fly, do they restrict their movements to saltmarshes, and can they use reflections from the sea to coordinate their flight? We just don't know!

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Bourley Road heathland, Aldershot Army Training Area, Hampshire, 14 July 2012

Leader: **Stephen Miles**. – At the allotted time of the start of the meeting it was raining heavily, whereas half-hour earlier when it was dry it seemed as though it might be a better and perhaps drier night than normal for the summer of 2012. Thus only one other member than the leader attended. As this site is a part of the Thames Basin Heaths Special Protection Area (SPA) special permission was obtained from Natural England for the site owners, the Ministry of Defence, to allow the meeting to take place.

The habitats present on this military training site are heathland and scrub with large nearby blocks of deciduous woodland. Much of the previous coniferous woodland had fortunately been cleared in recent years to re-establish the former heathland, which is now also grazed from time-to-time.

This was purely a British Entomological and Natural History Society (BENHS) field meeting to record moths. Although the leader did not run his trap because it is not waterproof, the only other member present, Tony Dobson, in already having a procedure for wet nights was able to run two light traps, an MV and a small actinic. Gradually the heavy rain became lighter and lighter until there was almost no rain by 22.30h.

Only one bat was seen at 21.35h and no nightjars were heard at all during the whole meeting. During our dusk tour of the site, cinnabar moth caterpillars were observed on ragwort as well as a Brown China-mark *Elophila nymphaeata* (L.) in a wetland part of the site at SU840505. The trap sites were situated in open grassland adjacent to 'heather' areas, the MV being placed nearest to the access road at SU841507 and the actinic light at SU841506 just north of Cheese Hill at the foot of a slope beside heather and gorse. The lights were switched on at 21.30h and both were turned off by 00.45h; we left the site at 01.15h in starlight having trapped or observed 61 species in somewhat less than ideal conditions for much of the time.

The results included the second example of the oecophorid *Batia lambdella* (Donovan) taken in North Hampshire. Also three nationally notable species were trapped or seen, the Horse Chestnut *Pachycnemia hippocastanaria* (Hübner), of which four specimens were attracted to the MV trap and 24 to the small 6-watt actinic; the Dotted Border Wave *Idaea sylvestraria* (Hübner) with two of each attracted to both traps; and one Great Oak Beauty *Hypomecis roboraria* (D. & S.) attracted to the MV trap. Other less often seen species were the tortricid *Epinotia signatana* (Douglas), Grass Emerald *Pseudoterpna pruinata* (Hufner), Small White Wave *Asthena albulata*

(Hufn), Four Dotted Footman *Cybosia mesomella* (L.), Striped Wainscot *Mythimna pudorina* (D. & S.), and The Suspected, *Parastichtis suspecta* (Hübner).

Thanks go to the Chairman of the Bourley Conservation Group, representing the Defence Infrastructure Organisation and to the staff of the Winchester branch of Natural England for permission to hold this meeting.

Wytham Woods, Berkshire, 14 October 2012

Leader: **Ian Sims**. – This field meeting was a follow-up to the one held at this location on 16th October 2011. Again, it was a joint meeting between the BE&NHS and the Berkshire Moth Group and had the same objectives as last year, namely to look for and record the scarce oak-feeding species *Phyllonorycter roboris* (Zeller) and *P. messaniella* (Zeller), and *P. nigrescentella* (Logan) mining bush-vetch (*Vicia sepium*).

Just as last year, the day was bright and sunny after a cool misty start. The meeting got under way at 11.00h. Again, our numbers were seven, though all but one attendee were different from last year's group. This year we left the car park heading south west, through a gate leading to a field occupied by sheep. A late *Parage aegeria* (L.) (Speckled Wood) was observed in flight along a forest ride while the party headed towards Marley Wood, an area of ancient woodland to the south of the hill. Leaf mining micro-lepidoptera, along with flies and other orders were few and far between. No doubt this was due to the unusually wet conditions during the preceding spring and summer. With much perseverance mines of micro-lepidoptera (mostly vacated) were found. These were in the foliage of beech, sycamore, oak, hazel, field maple, sloe and bramble. Some of these were collected for subsequent rearing.

It is said that the only folk who progress slower than microlepidopterists are lichenologists. This being so, lunch was taken in the younger woodland before we reached Marley Wood. During lunch two large beech trees were examined, as they supported strong growths of the bracket fungus *Ganoderma adspersum*, the host for larvae of several fungal feeding tineid moths. Some samples of this fungus showing signs of infestation were collected to enable moths and/or beetles to be reared. In the leaf mould under one of these trees we found several fruiting bodies of the collared earthstar (*Geastrum tripex* Jung.), a type of puff-ball (Fig. 1).



Fig. 1 Collared earth star fungus (*Geastrum tripex*) under beech. Photo: Tony Pritchard.

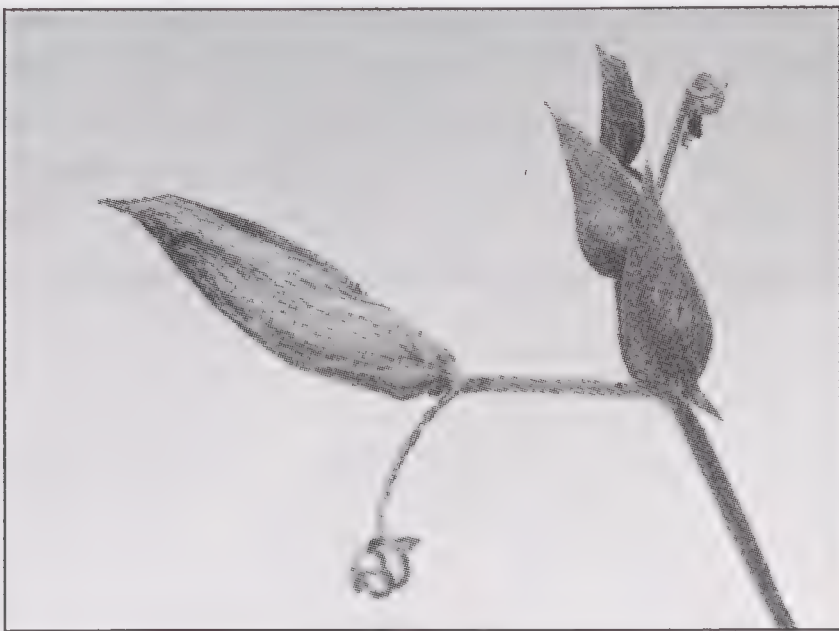


Fig. 2 Podded leaf caused by the tortricid *Ancyliis badiana* on meadow vetchling. Photo: Jon Cole.

After lunch the party proceeded to explore Marley Wood. Here several larvae of the nepticulid *Ectoedemia septembrella* (Stainton) were found mining in leaves of St. John's Wort.

On leaving Marley Wood, along a lane heading towards Home Farm, we were pleased to find what looked like several mines of one of our target phyllonoryctids, *P. nigrescentella* (Logan), on meadow vetchling. Subsequent investigation by Guy Meredith indicated that these might be the tortrix *Ancylis badiana* (D. & S.). It was lucky therefore that some of these damaged plants were retained for photographing and for rearing to confirm their identity (Fig. 2). Brian Elliott subsequently confirmed the species as *A. badiana* which forms a podded leaf (*pers. comm.*). It was noted that the vegetation bordering this lane had not been strimmed, unlike many other localities along the woodland rides where bush vetch was seen but no mines found.

Owing to the 'damp' weather this year fungi were particularly in evidence. Several interesting species were recorded, including the birch polypore *Piptosporus betulinus* (Bull. ex Fr.) growing on dead birch trunks, and *Diatrype disciformis* (Hoff.) on beech logs from which an example of the tineid moth *Triaxomera parasitella* (Hübner) was subsequently reared. A strong growth of sulphur tuft *Hypholoma fasciculare* (Huds. ex Fr.) was seen on beech. On finding young examples of the edible shaggy ink cap *Coprinus comatus* (Müll.) growing on a forest ride the group discussed the best way to cook them, but these particular examples were left *in situ*.

A total of 46 species of Lepidoptera (mostly leaf mining microlepidoptera) were identified on the day, or have been confirmed by subsequent rearing. Two species of Hemiptera were recorded, as were 13 species of other orders.

SHORT COMMUNICATION

New record of *Synanthedon myopaeformis* (Borkhausen) (Sesiidae) in north Kent. – With only about thirty records of the Red-belted Clearwing in the data base at the Kent & Medway Biological Record Centre it was a real treat to find this moth visiting the flowers on the brambles outside the offices at Brogdale, Faversham. The larvae live under the bark of old apple trees, so it is no great surprise that this species is present here at the home of the National Fruit Collections with > 2,200 cultivars of apple in the surrounding fields. It is usually found by the use of a pheromone lure, so a field sighting was extra special. – TONY WITTS, Kent & Medway Biological Records Centre, Brodgale, Faversham, Kent, ME13 8XZ.

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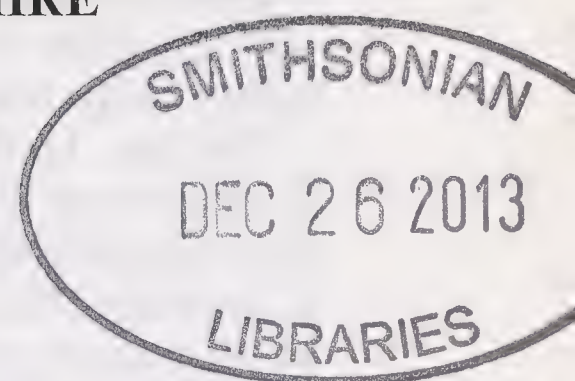
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***CORANUS AETHIOPS* JAKOVLEV (HEMIPTERA: REDUVIIDAE) – NEW TO BRITAIN, FROM SOUTH YORKSHIRE**

STUART FOSTER

128 Lyndale Avenue, Edenthorpe, Doncaster DN3 2JX
Email: stuart@blackdan6.plus.com



ABSTRACT

The assassin bug *Coranus aethiops* Jakovlev is reported as new to Britain from South Yorkshire, England. In Europe this species is considered to be restricted to boreo-alpine habitats and more tolerant to cold than other species of its genus. Its presence on South Yorkshire moss-peat moorland coincides with the restricted distribution of a number of post-glacial subarctic relict Diptera in Britain.

INTRODUCTION

A single female specimen of a *Coranus* reduviid bug was collected by the author on 20th September, 1979 on Thorne Moor (SE71), South Yorkshire. During 1990 several surveys were conducted as part of a wider study of moorland habitats on Thorne and Hatfield Moors when three male specimens of *Coranus* were captured in water traps on Hatfield Moor (SE60). All of these specimens were misidentified at that time as *Coranus subapterus* (De Geer) having been considered to be melanic forms of this species. In 2013 the author re-examined the four specimens of *Coranus* and using the key published in Faune de France Volume 92, Hémiptères Reduviidae D'Europe Occidentale (Putshkov & Moulet, 2009), identified them as *C. aethiops* Jakovlev.

DESCRIPTION

Southwood and Leston's Land and Water Bugs of the British Isles, published in 1959, recognised *C. subapterus* as the sole representative of its genus found in Britain. The 'heath form' of *C. subapterus* described by G. Woodroffe (Woodroffe, 1959) is now considered to be *Coranus woodroffei* P. Putshkov. The key included in the Faune de France publication provides a detailed treatment of the Western European members of the genus. Only brachypterous specimens of *C. aethiops* have been found in Britain so far, but macropterous forms co-occur elsewhere in Europe.

Coranus aethiops may be distinguished from both *C. subapterus* and *C. woodroffei* by its completely, or almost, black abdominal venter (with or without pale lateral spots) and in males by the spoon-shaped black parameres with broadly rounded apices (Plate 9, Figs. 1 and 3); in both *C. subapterus* and *C. woodroffei* the underside of the abdomen is predominantly pale coloured (Plate 9 Figs. 2 and 4) and in males the parameres are paler and shaped differently. More detailed descriptions of the species are provided by Straub & Günter (2006) and Putshkov & Moulet (2009).

ECOLOGY AND DISTRIBUTION

On Thorne Moor the verified specimen of *C. aethiops* was collected on the ground beneath heather *Erica/Calluna vulgaris* growing on drier sphagnum moss-peat at the edge of a more extensive area of damp and wet peat covered with cotton grass *Eriophorum* sp. and patches of sundew *Drosera* sp.

There are two records of *Coranus* known from other locations on Thorne Moor, pre-1990 and 1990, but these specimens are unavailable for verification of species

(Skidmore, 2006). The 1990 record was on dry peat with purple moor-grass *Molinia caerulea* in adjacent wetter parts, mature heather, cotton-grass tussocks and birch saplings; there is no habitat description for the location of the pre-1990 record. It is highly likely that these specimens were *C. aethiops*.

The first Hatfield Moor specimen of *Coranus*, from August 1984 (SE70), was a nymph swept from mature clumps of heather with adjacent dry peat, cotton-grass, bog rosemary *Andromeda polifolia* and birch. This specimen is lost but was probably *C. aethiops*. The 1990 verified records of *C. aethiops* from Hatfield Moor were from water traps on dry bare peat surrounded by mature heather, very close to the site of the 1984 record, with adjacent clumps of cotton-grass, bog rosemary, birch and stands of Scot's pine *Pinus sylvestris*.

According to Skidmore (2006) the ecology of the two moors differs in many respects due to different substrate permeability, Hatfield Moor being generally drier and having more the character of wet to dry heath. This appears to have no bearing on the occurrences of *C. aethiops*. Skidmore lists two species of Diptera, the anthomyiid *Zaphne proxima* (Malloch) and the ephydrid *Eutaenionotum guttipenne* v. *olivaceum* Oldenberg, as ancient residents of Thorne and Hatfield Moors; the former known from northern Sweden and throughout subarctic Canada, the latter nominate form has a subarctic distribution in Scandinavia and North America but the particular variety is only known from Thorne and Hatfield Moors and in northern Germany. He believed that the subarctic relicts such as these on Thorne and Hatfield Moors had persisted since late glacial times over 11,500 years ago when the area had a subarctic climate.

According to Putshkov and Moulet (2009) the ecology of *C. aethiops* is little known, however it appears to survive at temperatures below those that other species in the genus are able to tolerate, with adults thought to overwinter. They refer to specimens being found in moss swamps, in alpine meadows and taiga larch clearings.

Coranus aethiops is widely distributed across mainland Europe and has been reported from Finland, France (Alps), Norway, Russia and Sweden (Putshkov & Putshkov, 1996) and from Denmark, Germany, Czech Republic, Slovakia and Belarus (Straub & Günter, 2006). Putshkov and Moulet (2009) report that its range extends into eastern and western Siberia, Kazakhstan, Kirgizstan and Mongolia.

ACKNOWLEDGEMENTS

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EIGHT APHID PARASITOIDS (HYMENOPTERA: BRACONIDAE: APHIDIINAE) NEW TO BRITAIN

EDWARD A. BAKER & GAVIN R. BROAD

10, Bron Awelon, Barry, Vale of Glamorgan, CF62 6PR

Email: edbaker1975@hotmail.com

Department of Life Sciences, The Natural History Museum,

Cromwell Road, London SW7 5BD

Email: g.broad@nhm.ac.uk

ABSTRACT

Areopraon silvestre (Starý), *Binodoxys brevicornis* (Haliday), *Ephedrus helleni* Mackauer, *Ephedrus laevicollis* (Thomson), *Praon cavariellae* Starý, *Praon necans* Mackauer, *Praon yomenae* Takada and *Trioxyys tenuicaudus* Starý are reported new to Britain. Details of the locations of records, host associations, hyperparasitoids and identification are given.

INTRODUCTION

Baker & Broad (2009) briefly introduced the ecology and identification of the braconid subfamily Aphidiinae in the context of reporting the discovery of five species new to Britain, and this paper reports the discovery of a further eight species new to Britain, collected in Scotland and Wales. Otherwise there has been little published work in recent years on the natural history of aphid-parasitoid systems in Britain, although Müller *et al.* (1999) studied trophic relations between plants, aphids and aphid parasitoids in an abandoned field in Berkshire, England, and Polaszek (2011) reported one primary and one secondary aphid parasitoid new to Britain. This work contributes to knowledge of the British and European Aphidiinae, but the detailed faunal studies on the Continent such as Starý (2006) in relation to the Czech Republic and Kavallieratos *et al.* (2004) in relation to South-Eastern Europe are models for similar studies in Britain.

MATERIAL AND METHODS

Parasitoids were reared by the first author from aphid mummies collected on sections of host plant and stored at room temperature in clear plastic containers. Aphids were identified by the first author using Blackman & Eastop (1994, 2006) and Stroyan (1977). Parasitoids were identified provisionally by the first author using Mackauer (1959a, b), Starý (1966, 1971, 1972, 1978) Starý, Remaudière & Leclant (1971), Gärdenfors (1986), Davidian (2005), Kavallieratos *et al.* (2005), Rakhshani *et al.* (2007), and Tomanović *et al.* (2006a, b; 2009a, b; 2012). The identifications of *Areopraon silvestre* (Starý), *Binodoxys brevicornis* (Haliday), *Ephedrus helleni* Mackauer, *E. laevicollis* (Thomson), *Praon cavariellae* Starý (from Wales), *Praon necans* Mackauer and *Trioxyys tenuicaudus* Starý were confirmed by the second author. Dr Petr Starý (Institute of Entomology, Prague) confirmed the identification of *P. cavariellae* from Scotland. Dr Željko Tomanović (University of Belgrade) confirmed the identifications of *P. yomenae*. Hannes Baur (Natural History Museum, Bern) identified *Pachyneuron aphidis* (Bouché) and Dr Frank Van Veen (University of Exeter) and Mar Ferrer-Suay (University of Barcelona) identified Charipinae.

Areopraon silvestre (Starý)

In May 2011 two mummies of winged, female *Periphyllus testudinaceus* (Ferne) were collected from the leaf underside of an *Acer campestre* tree in the grounds of Roxby Court, Cardiff Bay (GR192758, VC 41). The mummies indicated parasitism by an aphidiine in the tribe Praini, with the aphid cadaver atop a silken cocoon. *Areopraon silvestre* was suspected as it is the only member of the Praini known to target *Periphyllus* spp. The silk forming the cocoons was brown – a feature reported by Starý (1972) as characteristic of *A. silvestre* diapause mummies adapted to follow the lifecycle of *Periphyllus* aphids present on their *Acer* hosts as diapause morphs in the summer. Diapause broke at the end of September when two female *A. silvestre* emerged. This would have coincided with the development of non-diapause aphids on *A. campestre*, potentially suitable for oviposition.

Tomanović *et al.* (2006b) separate species in *Areopraon* from other Praini by their carinated propodeum, densely setose ovipositor sheath with no apical spines and pupation under or within the aphid. Tomanović *et al.* (2006b), citing Starý (1971), report only the former type of pupation from *A. silvestre*, but that this requires confirmation. The keys in Tomanović *et al.* (2009a) and Davidian & Gavrilyuk (2011) enable separation of Palaearctic *Areopraon*. Apart from its specific association with *Periphyllus* aphids, the distinguishing characteristics of female *A. silvestre* are the 19–20 (rarely 17, 18, 21) segmented antennae; petiole 1.2–1.5 times as long as wide at spiracles level; first flagellar segment 4.0–4.5 times as long as median width and triangular stigma, 3.0–3.5 times as long as wide. Plate 10, Fig. 1 shows an adult female.

According to Tomanović *et al.* (2006b), on the basis of morphology and life history characters, *Areopraon* and *Pseudopraon* are basal genera within the Praini, which itself is considered one of the earliest diverging lineages in the Aphidiinae. *Areopraon* and *Pseudopraon* target aphids from basal lineages whereas *Praon* target more derived taxa. *Areopraon* and *Pseudopraon* pupate within or beneath their hosts whereas *Praon* pupate only beneath their hosts. Tomanović *et al.* (2006b) suggest that pupation beneath the host evolved to protect diapausing prepupae and secondarily to protect against hyperparasitoids.

Fauna Europaea (<http://www.faunaeur.org>) records *A. silvestre* from Bulgaria, Czech Republic, France, Slovakia and Switzerland. Tomanović *et al.* (2006b) add Serbia.

The discovery of *A. silvestre* complements that of the two other *Periphyllus* specialists in Europe, with *Aphidius setiger* Mackauer and *Trioxys falcatus* Mackauer reported new to Britain by Baker & Broad (2009). Casual observation suggests *A. silvestre* is rare and Željko Tomanović (pers. comm.) reports it is rarely reared in Europe. However, if it does pupate inside host aphids, separating such mummies from those of *T. falcatus* in the field may be impossible.

Binodoxys brevicornis (Haliday)

In May 2011 several *Binodoxys heraclei* (Haliday) and a female *B. brevicornis* were reared from brown mummies of *Cavariella theobaldi* (Gillette & Bragg) on a mature, narrow-leaved *Salix* at County Hall, Cardiff Bay. In June 2011 several females and males of *B. brevicornis* were reared from brown mummies of *Staegeriella necopinata* (Börner), feeding on *Galium verum* in Porthkerry Park, Barry, Vale of Glamorgan.

Mackauer (1968) and Mackauer & Starý (1967) restrict the host range of *B. brevicornis* to Aphidinae on Umbelliferae and *Salix*. They list *Cavariella*,

Hyadaphis, *Semiaphis anthrisci* Kaltenbach, *S. necopinata*, *Myzus cerasi* (F.) and *M. persicae* (Sulzer) as hosts, though Mackauer & Starý (1967) consider the latter two records questionable. Starý (1990) records *B. brevicornis* as *Trioxys brevicornis* in the Czech Republic from *Brachycorynella asparagi* (Mordvilko) on *Asparagus officinalis*. Žikić *et al.* (2012) record *B. brevicornis* targeting *Uhlmannia singularis* (Börner) on *Asperula longifolia* in Serbia.

According to Starý (1990), *B. brevicornis* ranges over all of Europe, North Africa and Asia Minor, extending to Central Asia. Despite Mackauer's (1959a, 1960, 1968) references to type material from England associated with aphids on *Angelica sylvestris*, Broad *et al.* (2012) record *B. brevicornis* from Ireland only. The reference in Mackauer (1968) to the lectotype of *B. brevicornis* from England is incorrect according to van Achterberg (1997). The lectotype of the junior synonym, *Aphidius minutus* Haliday is an Irish specimen (O'Connor *et al.*, 1999); Dr James O'Connor (pers. comm.) suggests that as Haliday described *Aphidius minutus* early in his career, it may have been collected in or around Holywood, County Down, Northern Ireland, but there are no locality data associated with the specimen.

Binodoxys brevicornis is most likely to be confused with *B. heraclei*, which has a similar host range, but is much more commonly reared from *Cavariella* aphids on their primary *Salix* hosts. The keys and figures in Mackauer (1959a, 1960), Rakhshani *et al.* (2007), Starý (1966), Tobias & Kiriác (1986), Tomanović *et al.* (2006) and Tremblay (1975) enable separation. Following Rakhshani *et al.* (2007), female *B. brevicornis* may be separated from *B. heraclei* using the following characters:

B. brevicornis

- 10 segmented antennae.
- Distance between primary and secondary tubercles on petiole shorter than width at spiracles.
- Prongs with 3 long setae on dorsal surface.
- Propodeum without central areola.

B. heraclei

- 11 segmented antennae.
- Distance between primary and secondary tubercles on petiole greater than width at spiracles.
- Prongs with 5–6 long setae on dorsal surface.
- Propodeum with distinct central areola.

Cavariella aphids are potential pests of willow, carrot, parsnip, celery and parsley, and although the aphid *Brachycorynella asparagi* is not known from Britain, it could establish as a pest of asparagus, so *B. brevicornis* has the potential to assist in biological control programmes.

Ephedrus helleni Mackauer

In June 2012 the first author surveyed aphids at the Dundreggan estate, Inverness-shire, Scotland. *Cavariella theobaldi* was identified there on *Salix aurita*. Black aphid mummies were scattered amongst the colonies from which two female and six male *E. helleni* emerged along with the hyperparasitoids *Alloxysta arcuata* (Kieffer) and *A. basimacula* (Cameron).

According to Gärdenfors (1986), *E. helleni* targets *Cavariella* spp., mainly on *Salix*, but also on their secondary hosts, and possibly utilises a wider range of hosts in the Macrosiphini.

Gärdenfors (1986) keys Palearctic *Ephedrus*. The polyphagous *E. plagiator* (Nees) may target *Cavariella*, but should not be confusable with *E. helleni*. Female *E. helleni* have antennae conspicuously thickened towards the apices, with segments 8 and 9 well separated, distinguishing it from *E. laevicollis* (Thomson) with which it had been previously confused, but which does not target *Cavariella*. Gärdenfors (1986) distinguishes female *E. helleni* from *E. nacheri* Quilis (not on the British list) by the fact that the first flagellar segment of the former is clearly longer than the second flagellar segment. Gärdenfors (1986) separates *E. helleni* with yellowish basal antennal segments from *E. cerasicola* Starý and *E. cavariellae* Takada (also not on the British list) by their comparatively shorter first flagellar segment and very short penultimate flagellar segment.

Gärdenfors (1986) records *E. helleni* from 'Central Europe', France, Finland, India, Iran, Japan, Poland and Sweden. Tomanović *et al.* (2009b) add Serbia and Montenegro.

Like *B. brevicornis* and *P. cavariellae*, *E. helleni* has the potential to assist in biological control programmes applied to *Cavariella* feeding on willow, carrot, parsnip, celery and parsley.

Ephedrus laevicollis (Thomson)

In May 2011, large numbers of black mummies were found amongst mixed colonies of *Myzaphis bucktoni* Jacob and *M. rosarum* (Kaltenbach) on *Rosa pimpinellifolia* at Merthyr Mawr Warren National Nature Reserve, near Bridgend, Glamorgan. Rearing produced several female and male *E. laevicollis* and as yet unidentified *Alloxysta* hyperparasitoids.

Gärdenfors (1986) reports *E. laevicollis* as a specialised parasitoid of Macrosiphini on *Rosa* spp., (*Chaetosiphon tetrarhodum* (Walker), *Longicaudus trirhodus* (Walker), *M. bucktoni* and *M. rosarum*), and records it from Sweden, Finland, Ireland, Britain, Netherlands, Germany, Czech Republic, the former USSR and Mongolia. Fauna Europaea adds Lithuania, Moldova, Poland, Slovakia, Spain and at least one of the countries making up the former Yugoslavia. Žikić *et al.* (2012) includes a record of *E. laevicollis* targeting *L. trirhodus* on *Thalictrum minus* ssp. *majus* in Serbia.

Broad *et al.* (2012) record *E. laevicollis* from Ireland only and the only *E. laevicollis* examined by Gärdenfors (1986) from Britain or Ireland were from the Haliday collection at the National Museum of Ireland (NMI). O' Connor *et al.* (1999) report this material to comprise specimens collected by A. H. Haliday and A. W. Stelfox within the traditional county of Dublin in the Republic of Ireland. Included are a male and female swept from *R. pimpinellifolia* at the sand-hills of Malahide – a similar habitat to Merthyr Mawr.

Ephedrus laevicollis is unlikely to be confused with other species since, according to Gärdenfors (1986), no other *Ephedrus* species specifically targets the same aphids on *Rosa*. However, should confusion arise with polyphagous species such as *E. plagiator*, the keys in Gärdenfors (1986) should provide clarification.

Praon cavariellae Starý

In June 2012 light brown mummies of *Cavariella theobaldi* were found on two *Salix aurita* during the first author's aphid survey at the Dundreggan estate,

Inverness-shire, Scotland. Although it was not obvious in the field, the aphid cadavers were slightly elevated above a basal cocoon indicating parasitism by a species in the tribe Praini. Rearing produced four male and six female *Praon cavariellae*, a single *Alloxysta castanea* (Hartig) hyperparasitoid and a male *Dendrocerus carpenteri* (Curtis) pseudohyperparasitoid. In August 2012 the first author captured a female *P. cavariellae* ovipositing in *C. theobaldi* on *Pastinaca sativa* growing on 'brown-field' land off Schooner Way, Cardiff Bay, and a female was reared from a *C. theobaldi* mummy on the same plant.

Unlike specimens reared in France and the Czech Republic, the British specimens had 14 rather than 15 antennal segments, but Petr Starý (pers. comm.) considers this to be within the normal range of variation.

Starý *et al.* (1971) report *P. cavariellae* from *Cavariella aegopodii* (Scopoli) on *Foeniculum* and *Salix purpurea* in France and a *Cavariella* on Daucaceae in the former Czechoslovakia. Starý (2006) reports *P. cavariellae* from *C. theobaldi* on a *Heracleum* and *Cavariella* species on Umbelliferae, Daucaceae and a *Salix* species. The records from Britain confirm the specific association with *Cavariella* on their primary and secondary hosts. Since no other *Praon* species are known to target *Cavariella* in Europe, *P. cavariellae* is unlikely to be confused with other species. Field identification of *P. cavariellae* ought to be possible if the basal cocoons are clearly visible but, in the first author's experience to date, basal cocoons are not clearly visible in the field, and in these cases the only difference with mummies induced by *Binodoxys* is the typically darker brown colour of the latter. Mummies induced by *Aphidius salicis* Haliday, which also targets *Cavariella*, may also be confused with those of *P. cavariellae* in the field.

Fauna Europaea records *P. cavariellae* from the Czech Republic and France, but it is likely to be widespread wherever *Cavariella* aphids occur.

Like *B. brevicornis* and *E. helleni*, *P. cavariellae* has the potential to contribute to biological control programmes applied to crops upon which *Cavariella* aphids feed.

Praon necans Mackauer

In the summer of 2011 a bed of *Nymphaea alba* in a canal between Haxby and Kirkby Court, Cardiff Bay, was heavily colonised by *Rhopalosiphum nymphaeae* (L.). By August many light brown aphid mummies elevated above white cocoons and smaller numbers of black mummies lacking basal cocoons were evident. In September the water-lilies turned brown and by October there were no aphids.

Rearing produced *P. necans* from light brown mummies and *Ephedrus plagiator* from black mummies. Hyperparasitoids via *P. necans* comprised an as yet unidentified *Alloxysta* sp. (Cynipidae) and *Phaenoglyphis villosa* (Hartig) (Cynipidae). Pseudo-hyperparasitoids comprised an *Asaphes* sp. (Pteromalidae). A male megaspilid *Dendrocerus laticeps* (Hedicke) pseudohyperparasitoid was reared via *E. plagiator*.

Praon necans can be identified using Mackauer (1959b), Kavallieratos *et al.* (2005), Starý (1966) and Tomanović *et al.* (2012). Plate 10, Fig. 2 shows an adult female. Tomanović *et al.* (2012) describe *P. necans* as a strictly wetland species, involved in the largest (16) number of tritrophic associations known for any aphidiine in such habitats in the Western Palaearctic. According to Starý (1966) and records in Tomanović *et al.* (2012), the main host for *P. necans* is *R. nymphaeae*, which feeds on a wide range of wetland plants, including rice (Starý, 1981). No other *Praon* species is known to parasitise *R. nymphaeae* – its apparent nearest relative, *P. gallicum* Starý (Tomanović *et al.*, 2006b) specialises on grass-feeding aphids. Mackauer (1968) and Mackauer & Starý (1967) list *R. oxyacanthae* (Schrank) under the name *R. insertum*

(Walker) as a host; Starý (2006) lists single host records for *R. rufulum* Richards and a *Schizaphis* species, and Kos *et al.* (2012) report *Staticobium limonii* (Contarini) as a host in Slovenia.

Fauna Europaea records *P. necans* from the Czech Republic, Finland, Germany, Italy, Moldova, Poland, Russia, Netherlands and at least one of the countries making up the former Yugoslavia. Kos *et al.* (2012) add Slovenia and Tomanović *et al.* (2012) add France, Portugal and Hungary.

Based on the numbers of mummified aphids visible in Plate 10, Fig. 3, *P. necans* can be an effective parasitoid. Disturbance to *P. necans* by ants and other insects incapable of flight must be limited on aquatic hosts such as *N. alba*. However, *Lasius niger* (L.) did forage honeydew excreted by *R. nymphaeae* by walking down the canal wall onto plants adjoining it. Hoverflies and other Diptera foraged for honeydew and unidentified aphidophagous hoverfly larvae predated aphids. The larvae of an aphidophagous gall midge (Cecidomyiidae) were abundant on some plants.

Praon yomenae Takada

In June 2009 and 2011 brown mummies of *Uroleucon jaceae* (L.) were collected from *Centaurea nigra* at Cardiff Bay Wetlands Reserve. *Aphidius funebris* Mackauer, a specialised parasitoid of *Uroleucon*, was reared from mummies affixed directly to the plant surface. From elevated mummies atop white cocoons, parasitoids provisionally identified as *P. yomenae* were reared. Two females were sent to Dr Željko Tomanović at the University of Belgrade, whose group is studying the genetics and morphology of the *P. dorsale* (Haliday) – *P. yomenae* group, and who confirmed their identity as *P. yomenae*. Secondary parasitoids were reared in 2009 as follows, but it is not known whether they were parasitising *A. funebris* or *P. yomenae*: *Alloxysta leunisii* (Hartig) (1 macropterous male); *A. cursor* (Hartig)/*pedestris* (Curtis) (2 brachypterous females); *Asaphes vulgaris* Walker; *Dendrocerus carpenteri* (Curtis) and *Pachyneuron aphidis*. In 2011, *Phaenoglyphis salicis* (Cameron) was reared, but again it is not known whether the primary host was *A. funebris* or *P. yomenae*.

In July 2013, a colony of *Uroleucon tanacetii* (L.) on *Tanacetum vulgare* at Duffryn Gardens in the Vale of Glamorgan was found to be extensively parasitized by *P. yomenae*.

Kavallieratos *et al.* (2005) and Tomanović *et al.* (2003) characterise female *P. yomenae* by the following characters: 18-19 (20) segmented antennae; lateral lobes of the mesonotum with large hairless areas; forewing m-cu vein colourless and Rs + M vein colourless. However, according to Željko Tomanović (pers. comm.), fore wing characters for *P. yomenae* can be variable and Rakhshani *et al.* (2012) characterise *P. yomenae* by the flagellar segment 1 entirely yellow; m-cu vein nebulous throughout or tubular at the posterior part; lateral mesonotal lobes with large hairless areas; propodeum densely pubescent; petiole with few setae and ovipositor with concave dorsal outline.

According to Tomanović *et al.* (2003), aside from *P. yomenae*, *Praon nonveilleri* Tomanović & Kavallieratos, *P. unitum* (Mescheloff & Rosen), *P. uroleucon* Tomanović & Kavallieratos and *P. volucre* (Haliday) are known from *Uroleucon* hosts in the Western Palaearctic. *Praon volucre* is polyphagous and present in Britain. Following Kavallieratos *et al.* (2005), Tomanović *et al.* (2003) and Rakhshani *et al.* (2012) its distinguishing features are a dark (with yellowish base) flagellar segment 1; 17–18 (19) segmented antennae; lateral mesonotal lobes densely pubescent or with small hairless areas; fore wing vein m-cu vein pigmented or tubular

throughout; vein Rs + M pigmented at its first half; forewing stigma 1.40–1.65 times as long as R1; petiole densely setose and ovipositor sheath with a concave dorsal outline. The remaining species are not known from Britain, are morphologically distinct and are not known to target *U. jaceae*.

Starý (1966) and Mackauer & Starý (1967) report *P. dorsale* (Haliday) from European *Uroleucon* species, but Tremblay & Pennachio (1985, 1986) found that type material of *P. dorsale* from an unknown host in the BMNH and specimens from *Corylobium avellanae* (Schrank) in Italy did not correspond with *P. dorsale* auctt. Following examination of specimens, *P. longicorne* Marshall was reinstated as a valid species and *P. dorsale* from *Uroleucon* hosts re-identified as *P. yomenae* and reported as a typical parasitoid of *Uroleucon* in the Mediterranean.

Tremblay & Pennachio (1985) cite Haliday in Marshall (1891) in referring to *P. dorsale* as rare. Željko Tomanović (pers. comm.) reports it as not very common but reared from Macrosiphini throughout the Palaearctic. Müller *et al.* (1999) record it from *Acyrtosiphon pisum* (Harris); *Amphorophora rubi* (Kaltenbach); *Aphis* sp. (on *Epilobium* sp.); *Macrosiphum funestum* (Macchiati); *Megoura viciae* Buckton; *Microlophium carnosum* (Buckton); *Macrosiphum ptericolens* Patch and *Sitobion* spp. Van Veen *et al.* (2008) add *Megourella purpurea* Hille Ris Lambers; *Myzus* sp. and *Uroleucon cirsii* (L.). If these records are correct then *P. dorsale* is polyphagous. Alternatively some of the records may represent undescribed or other *Praon* species recorded from these hosts such as *P. barbatum* Mackauer from *A. pisum*; *P. megourae* Starý from *M. viciae* and *P. yomenae* from *U. cirsii*. Frank Van Veen (pers. comm.) has reared *P. dorsale* from *M. carnosum*, *A. pisum* and *M. viciae*, and the ‘same’ species from *Uroleucon*, along with *P. volucre*. Žikić *et al.* (2012) reports *P. dorsale* and *P. longicorne* from *Uroleucon cichorii* in Serbia. The first author has reared *P. dorsale* only from *C. avellanae* in Cardiff.

Praon yomenae was originally described from Japan by Takada (1968), reared from *Macrosiphoniella yomenae* (Shinji). Yamauchi & Takada (1978) reported *Uroleucon formosanus* (Takahashi) as a host. Tremblay & Pennachio (1985) add *A. pisum*, quoting Starý (1976) and Tomanović *et al.* (2003) list the following *Uroleucon* hosts in the Western Palaearctic: *Uroleucon cichorii* (Koch); *U. sonchi* (L.); *U. aeneum* (Hille Ris Lambers); *U. doronici* (Börner); *U. jaceae* and *U. cichorii* ssp. *grossum* (Hille Ris Lambers). The only recent records of *P. yomenae* from a *U. jaceae* – *Centaurea* association known to the authors are *U. jaceae* – *C. jacea* in Starý (2006); *U. jaceae* – *C. depressa* in Rakhshani *et al.* (2007) and *U. jaceae* – *Centaurea stoebe* in Starý & Luká (2009). Völkl & Starý (1988) report *P. yomenae* under the name *P. dorsale* from *U. jaceae* – *C. jacea* and *U. jaceae* – *C. scabiosa* associations.

Fauna Europaea records *P. yomenae* from Bulgaria, Greece, Italy, Poland, Russia, Slovenia, The Netherlands, Turkey, Ukraine and at least one country of the former Yugoslavia. Rakhshani *et al.* (2007) report *P. yomenae* from Iran; Starý (2006) and Starý & Luká (2009) give records from the Czech Republic and Slovakia respectively.

It is hoped that the ongoing work at the University of Belgrade will address the suggestion by Tomanović *et al.* (2003) that the taxonomic and host range status of *P. yomenae*, *P. dorsale* and *P. longicorne* requires full revision with representative material from different regions worldwide and comparison of the morphological and molecular markers for *P. yomenae* from Europe and the Far East.

Praon yomenae is probably a common parasitoid of *Uroleucon* feeding on Compositae in Britain, in a wide range of habitats. Although *Uroleucon* aphids are not crop pests, Völkl and Starý (1988) suggest that they and their primary parasitoids could be important as alternative hosts for hyperparasitoids of primary parasitoids that attack crop pest aphids and represent a food source for aphidophagous

predators such as coccinellids or syrphid larvae. *Uroleucon* aphids are not attended by ants, but they are large, with long legs capable of kicking enemies, and when disturbed, are able to rapidly withdraw their stylets and drop from their host. Work is required to establish more precisely the distribution, host range and hyperparasitoids of *P. yomenae* in Britain, and field observations of its foraging should show how it has adapted to the defensive behaviour of its hosts.

Trioxys tenuicaudus Starý

In June 2013 three female *Trioxys tenuicaudus* were reared from brown mummies of wingless *Eucallipterus tiliae* (L.), feeding on *Tilia platyphyllos* in Bute Park, Cardiff.

According to Starý (1978), *T. tenuicaudus* and *T. pallidus* (Haliday) are common parasitoids of *E. tiliae* in Europe and *T. curvicaudus* Mackauer is a very common parasitoid of this host. In Bute Park, all three species have been reared from *E. tiliae* on *T. platyphyllos* but with *T. curvicaudus* most common. However, rearing from a *T. platyphyllos* avenue on Lloyd George Avenue in Cardiff in 2012 produced only *T. pallidus*.

In line with the observations of Olkowski *et al.* (1982) observations from Cardiff suggest that *T. curvicaudus* targets later aphid instars and the resultant mummies are usually pale, and frequently comprise winged adults. In contrast, *T. pallidus* and *T. tenuicaudus* seem to target earlier instars and have been reared from small, brown mummies. Olkowski *et al.* (1982) report that whilst *T. tenuicaudus* takes several years to travel a few blocks from its point of dissemination, *T. curvicaudus* covers the same distance during its first year of establishment. They suggest that the winged aphids targeted by *T. curvicaudus* are responsible for this greater dispersive ability.

Following Starý (1978), *T. pallidus* and *T. tenuicaudus* can be considered generalist parasitoids of aphids in the Calaphidinae, though *T. pallidus* favours hosts in *Tuberculatus* and *T. tenuicaudus* favours hosts in *Myzocallis* aphids. *Trioxys curvicaudus* is a specialist on *E. tiliae*, but will also occasionally target other Calaphidinae. Using Starý (1978) and Davidian (2005), aside from its host associations *T. tenuicaudus* can be readily separated from its congeners by the presence of just one oblique hair at the apex of the dorsal part of the prongs.

Fauna Europaea reports *T. tenuicaudus* from the Czech Republic, Greece, Italy, Latvia and Poland. Davidian (2005) gives its distribution as the European part of Russia, western Caucasus, Eastern Europe, China and Australia (introduced). Olkowski *et al.* (1982) report its introduction to North America in 1972 in an attempt to control the elm aphid *Tinocallis platani* Kaltenbach.

DISCUSSION

The aphid parasitoids reported in this paper are all overlooked components of our native fauna, and many more new associations probably await discovery.

Without a detailed knowledge of naturally occurring parasitoid guilds, the use of aphid parasitoids in biological control lacks a sound theoretical basis. For example, although *Binodoxys brevicornis*, *Ephedrus helleni* and *Praon cavariellae* all target host-alternating *Cavariella* aphids, *B. brevicornis* has been reared primarily from aphids on secondary herbaceous hosts, whereas *E. helleni* mainly targets aphids on primary woody hosts. *Praon cavariellae* is less well known, but rearing data so far suggest it is equally capable of targeting aphids on primary and secondary hosts.

Although *Areopraon silvestre* is not of significant interest in terms of biological control, the fact that it seems to be a rare species in Europe invites further investigation into its ecology, since its hosts are common. It is possible that its mummies, like those of *P. cavariellae* reported in this paper, may not always show obvious development of a basal cocoon in the field. Field observations by naturalists can offer valuable insights into this sort of problem.

The identification of aphid parasitoids is not easy, and the literature to enable identification is frequently dated, or scattered amongst obscure journals. Nevertheless, since many aphid parasitoids show high host specificity, so long as the host aphid is identified correctly, parasitoid identification can be made more straightforward. In addition, aphid mummy characteristics (colour, internal/external cocoon, exit-hole position), so long as the aphid and host plant is known, can sometimes enable identification of a parasitoid to generic level at least. With practice, the different genera of primary and secondary aphid parasitoids can also be identified from field observations of oviposition behaviour.

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BOOK REVIEW

Keys to the Adults of Seed and Leaf Beetles of Britain and Ireland (Coleoptera: Orsodacnidae, Megalopodidae and Chrysomelidae) by David Hubble. 244 × 175mm, 136 pages, softback. Published by the Field Studies Council, 2012. Occasional Publication 156. £8.50 plus p.&p. ISBN 978 1 908819 08 6.

This latest contribution to the Aidgap series embodies keys to the adults of the Chrysomelidae (277 species now including the 'bruchids') also the Orsodacnidae (2 species) and the Megalopodidae (3 species). The group includes many colourful species which appeal to us all – general naturalists as well as the serious coleopterists. However, not surprisingly, it also includes many smaller species for which these keys are most likely to be used.

A brief introduction – collection notes, morphology, glossary of terms, rarity categories

and current checklist of species – is followed by the main content – over 90 pages, providing dichotomous keys to 282 species with brief notes on distribution and foodplant; marginal realistic line illustrations greatly assist in the interpretation of the keys. The book concludes with a bibliographical list of references and the index.

In my experience, some of the most difficult challenges likely to be encountered in this group, are probably to be found in the largest genus – *Longitarsus* (42 species). Single specimens are often encountered with no guiding information as to habitat or foodplant. Many of the species are externally superficially quite similar to each other, yet individually 'micro variable' whereupon genitalia dissection is more or less essential. Most of the male aedeagi are well illustrated, however, I am disappointed that the opportunity has not been taken to include any reference to the female spermatheca which in some instances can be more diagnostic than the aedeagus. Indeed, there is no mention of the spermatheca anywhere in the book and consequently does not merit inclusion in the glossary of terms. This omission necessitates reference to other sources, e.g. Kevan (1967, *Entomologists Monthly Magazine*, 103: 83–110) or more recently Doguet (Faune de France, Volume 2 Alticinae) reprinted in 1994 but unfortunately not available with English text.

Nevertheless, this inexpensive volume is 'user-friendly', the text is in English (brilliant), and represents the most current information and is a welcome contribution to the Aidgap objectives. I have used many of the keys for several months and so far have been satisfied with the results. Every coleopterist should have this book readily available for reference – perhaps an ideal Christmas present?

NORMAN HEAL

EMERGENCE PATTERN OF *BOMBYLIUS MAJOR* (DIPTERA: BOMBYLIIDAE) AND ITS PARASITISM RATE ON *ANDRENA CINERARIA* (HYMENOPTERA: ANDRENIDAE) AT A DEVON BANK

C. MARTIN DRAKE

Orchid House, Burr ridge, Axminster, Devon EX13 7DF

ABSTRACT

Fifty newly emerged adults and 153 pupal exuviae of *Bombylius major* L., were counted during an emergence period lasting 17 days in April 2013 at a colony of the bee *Andrena cineraria* L. The number of bees was indirectly estimated from counts of nest holes. Parasitism of about 8% was estimated although the error was likely to have been large. Male *B. major* emerged slightly earlier in the month than females. Emergence peaked between 9:00–11:00h in the morning. Timing of emergence was unrelated to air temperature. Females completed emergence two days before the first was seen ovipositing at the site, suggesting that they moved away for a while before returning to breed. Birds were an important cause of mortality in both *B. major* and *A. cineraria*. The oil beetle *Meloe violaceus* Marsham was frequent at the bee colony.

INTRODUCTION

Bombylius major L. is a common and widespread spring bee-fly in England and Wales and also one of the most widespread bee-flies in the world, with a Holarctic distribution that extends to North Africa and the Oriental region (Greathead & Evenhuis, 2004). Consequently there are plenty of casual observations on hosts, flower-visiting and other aspects of the adults' ecology (summarised in Stubbs & Drake, 2001). However, there is little quantitative information on the abundance of the fly in relation to its hosts. Indeed, there are few studies that quantify aspects such as rates of parasitism of any bee-fly. Notable studies of bee parasites are of *Heterostylum robustum* (Osten Sacken) and *Bombylius pulchellus* Loew on two species of Halictidae in North America (Bohart, Stephen & Eppley, 1960; Frick, 1962; Packer, 1988), *B. major* on *Andrena scotica* Perkins in Sweden (Paxton, Tengö & Hedström, 1996) and *A. vaga* Panzer in Germany (Fellendorf, Mohra & Paxton, 2004).

These authors counted bees and bee-flies using a variety of methods. Paxton *et al.* (1996) studied *Andrena scotica*, a communally nesting bee whose females use a common entrance leading to many cells. They induced females to nest in artificial nesting tubes of soil then, the following year, excavated the tubes to examine the contents of the brood cells, from which they estimated the rate of parasitism by *B. major*. Packer (1988) also excavated nests of the communal nesting *Halictus ligatus* Say to obtain estimates of the parasitism by *Bombylius pulchellus* in Canada. Frick (1962), in his very detailed study of *H. robustum* and its bee host *Nomia melanderi* Cockerell, took wide soil cores that he dissected to record the depth at which larvae lived, and erected emergence traps over the colonies. Bohart *et al.* (1960), working on the same North American bee, presumably also excavated nests to obtain the rate of parasitism. Paxton & Pohl (1999) placed small emergence traps over individual nest tunnels located in the previous year, and examined them daily for emerging insects during the flight period. Fellendorf, Mohra & Paxton (2004) also used emergence traps to collect emerging *Andrena vaga* Panzer and its parasites but these were larger and randomly placed in the colony; the traps were deployed in the year following an estimation of the bee population obtained by counting the

number of bee burrows in fixed-area quadrats. The rate of parasitism in these studies was then estimated either using counts of prepupal bees and parasites when counted in excavations, or as the proportion of parasites emerging from a known number of bees nesting in the same or the previous year.

Following the example of these studies, the aim of the present work was to quantify the rate of parasitism of *B. major* on the host *Andrena cineraria* (L.). This was prompted by the desire to improve on a previous crude estimate of the abundance of *B. major* and *B. discolor* Mikan using *A. cineraria* in the countryside around the author's home (Drake, 2013). *Andrena cineraria* is a ground-nesting bee that digs its own unshared tunnel in which it provisions two or three cells (Edwards & Telfer, 2002). One female presumably digs and provisions several tunnels in her life-time. They nest communally and may form huge colonies occupying a small area. In the present study the approach used was to count emerging bee-flies and estimate the abundance of bees using the hole-counting method of Fellendorf, Mohra & Paxton (2004).

METHODS

The site was the roadside boundary of the author's garden at Burrridge, Devon (ST313061). It consisted of a low Devon earth bank 23.5m long between a gate and the entrance to a track. It was 35cm high at the lowest point rising to 65cm at the highest, and mostly sparsely vegetated with grass, a few herbs and ivy (*Hedera helix*), and surmounted by a hedge dominated by hazel (*Corylus avellana*) that was planted 12 years previously. The side that faced the sun for most of the day supported the bee colony and was the roadside, with tarmac at its foot. This bank remained in sunshine until 15:30h. The other side was the garden, and was shaded until 16:00h.

The emergence of *B. major* was followed over the period 6–29 April 2013. Each day, with one exception, the hedge bank was examined at frequent intervals, mostly between 0.5 and 1.5 hours apart, from about 8:00h until no emerging *Bombylus* were seen, which was usually before noon although later checks were often made. The time taken searching the bank was about 10 minutes, walking or crouching at a slow pace. All adult *B. major* were noted, sexed, and their position marked with a small twig so that they could be re-located on subsequent searches. These individuals were inactive or lethargic as they had only recently emerged and air temperature was too low for flight on most days; they could, for instance, be prodded and photographed close-up, even sitting on a finger. It was certain that they did not include any that had emerged elsewhere but flown onto the bank. All pupal exuviae visible during the examination were collected, including those associated with recently emerged adults. The distance between adults and their pupal exuviae, when visible, was estimated by eye to the nearest centimetre. On three occasions late in the emergence period, a thorough examination of the bank was carried out to find exuviae that were not superficially visible. This took over 2 hours. All exuviae were sexed after collection. They were all *B. major* (no *B. discolor*, although this species was seen in the garden on 1 and 3 May).

The temperature was measured frequently on a mercury thermometer placed close to the ground on the shaded side of the bank. The weather was noted.

The population size of the bees was estimated from the number of burrows made in the spring of 2013. Ten randomly selected lengths of bank, each 0.5m long, were searched for holes of the right size for *A. cineraria* (at least 5mm in diameter). Actively used new nest-holes were easily recognised by their neat appearance and the presence of excavated soil. Slightly smaller holes, possibly made by emerging bees,

were likely to have been included in the count but they were not differentiated from active nests, so may have led to some double-counting of the bee population. Other holes could not be attributed with certainty to *Andrena* although few other animals were likely to have made them, and cursory inspection well before the bees emerged showed there to be almost no obvious holes of the right diameter apart from a few that may have been those of *Meloe violaceus* Marsham (Meloidae). The position of holes was marked with small wooden 'flags' to prevent double-counting and these were left in position. Counts were made twice, on 29 April and 1 May and again on 7 May when only new unmarked holes were counted. Counts were converted to densities after measuring the height of the bank up its slope (not the vertical height) from its base to the trunks of hedging or to where leaf litter made the ground unattractive to nesting bees. These values were log-transformed to obtain a confidence limit ($\times$ and $\div$ the arithmetic mean, not the geometric mean, as suggested by Elliott, 1977), and the total number of bees obtained by multiplying the mean density by the banks' entire area.

Predation by small birds, most probably robin *Erithacus rubecula* (L.) and perhaps also dunnoek *Prunella modularis* (L.) and great tit *Parus major* L., was early on thought to be responsible for the rapid disappearance of recently emerged *Bombylus* so short lengths (totally about 3m) of wire netting were used to cover part of the bank where most flies emerged.

RESULTS

Between 7 and 23 April, 50 adults (18 males and 32 females) were seen emerging on the hedge bank. This was one third of the number that were recorded by collecting pupal exuviae, of which 153 were recovered. Exuviae belonging to emerging adults were collected shortly after the adult had disappeared but about one fifth of these could not be found. When these adults lacking exuviae were added to the total exuviae count, there were 164 individuals. Some of these missing exuviae may have been found later in one of the thorough searches but the error in double counting would have been small. The sex ratio of pupal exuviae was almost equal (78 males, 74 females, one not sexed).

Males started emerging before females (Fig. 1). This result was based on just adults since exuviae of both sexes continued to be recovered throughout the study so the date when they were found gave no indication of the emergence date. The beginning of the emergence period of males was presumably missed, since many fewer adult males than females were seen yet the pupal exuviae showed the sex ratio was equal. The first female was seen four days after the first known male, and the last male was seen three days before the last female, so the difference in the emergence was slight but appeared to be real.

Emergence took place in the morning, with most flies being first seen in the two hours between 9:00h and 11:00h (Fig. 2). The earliest was seen, having just emerged, at 8:10h and the latest at 13:30h (i.e. 0.5h after celestial noon at British Summer Time). Newly emerged flies were distinguished by their crumpled wings which took about five minutes to expand fully. The cue for emergence did not appear to be air temperature as there was no relationship between the number of adults emerging and either the temperature when a fly emerged or the maximum morning temperature taken over the entire emergence period (Fig. 3).

Once they escaped from the pupal exuviae, adults moved only a short distance to find a suitable structure to hang on while their wings extended and hardened. For 35 individuals, this distance averaged 5.25cm (range 2–10cm).

The time between the first sighting and when last seen provided an approximate indication of how long it took before the flies were able to fly. The average time from first to last sighting was 82 minutes, and from first sighting to when the fly had disappeared was 107 minutes, thus flies appeared to take a considerable time to reach a condition fit for flying under unfavourable weather conditions.

The netting used to discourage birds was probably not particularly effective but the time elapsed between the first and last sightings of flies under netting was markedly longer (63 minutes, N=19) than for those unprotected (25 minutes, N=14). This comparison was made from the date when netting was first used so the times do not tally with those given above for the entire study period. The comparison was clearly not a rigorous design but it did provide additional support for the suggestion that birds ate the flies before they could fly.

The total number of *A. cineraria* nesting at the beginning of May was estimated at 622, with lower and upper confidence limits of 423 and 916, and the number of new holes made in the following week was 311 (179–541) giving a total of 933 (690–1165). There was no correlation between the numbers of original and new holes ($r^2 = 0.004$). Despite the application of confidence limits to the actual counts, these estimates must be considered crude for reasons discussed later.

A single *A. cineraria* was first seen on 12 April but no more were seen until 17 April which appeared to mark the real beginning of their emergence. They were seen on most days thereafter. Thus the bees emerged later than *B. major*. No other species of bee of comparable size was seen at the bank during the study period. The smaller bee *Nomada lathburiana* Kirby, which is the cleptoparasite of *A. cineraria*, may become an inadvertent and probably inadequate host of *B. major*; the first was seen on 27 April and they continued flying well after observations on the bombyliid had finished.

Bombylius major was first seen ovipositing on the bank on 25 April, 14 days after the first female was seen emerging and two days after the last. Except for one cold day, they oviposited until 7 May (13 days of ovipositing), after which the weather became cold and wet for a week and no flies and very few bees were seen after this date.

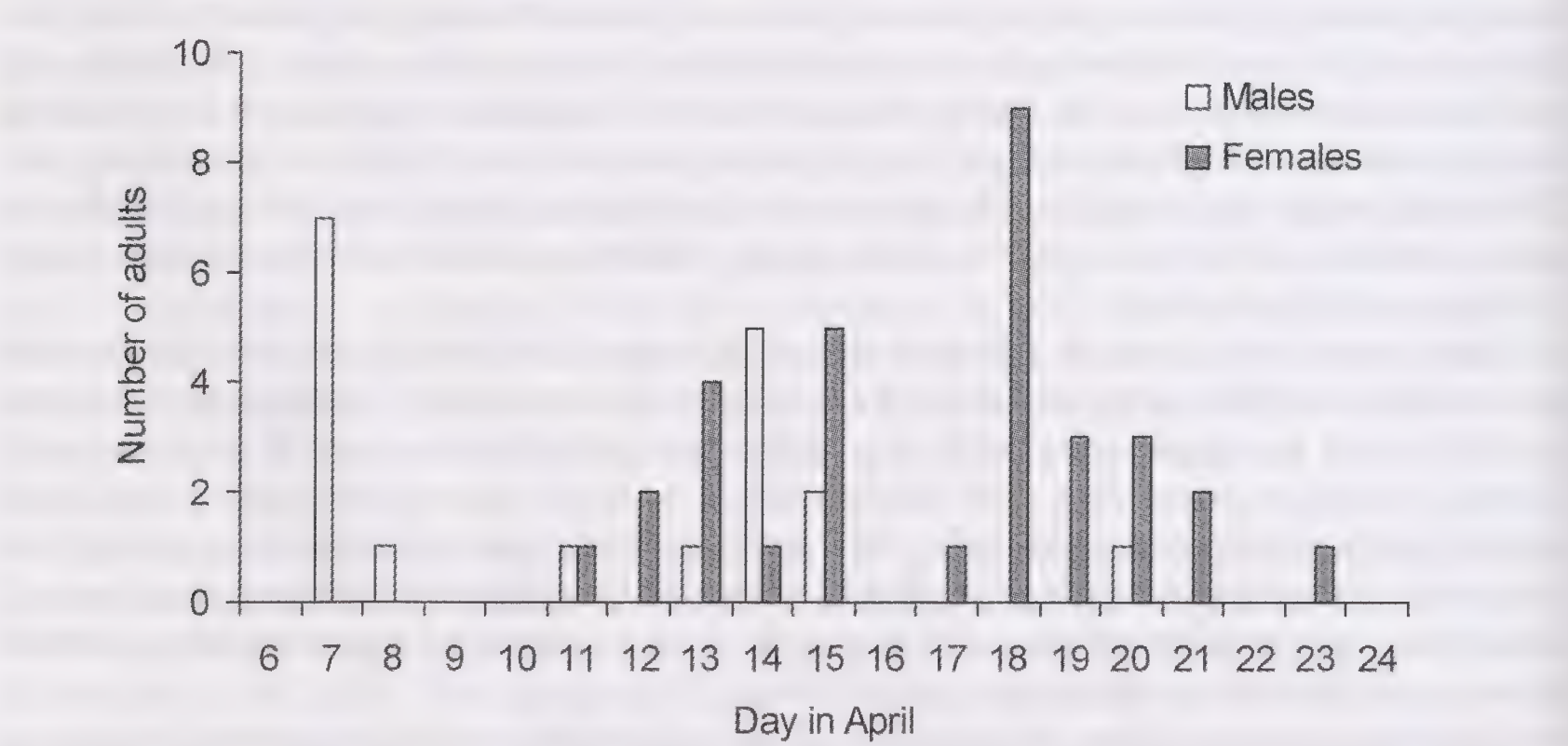


Figure 1. Number of newly emerged adult male and female *Bombylius major* counted on each date in April 2013.

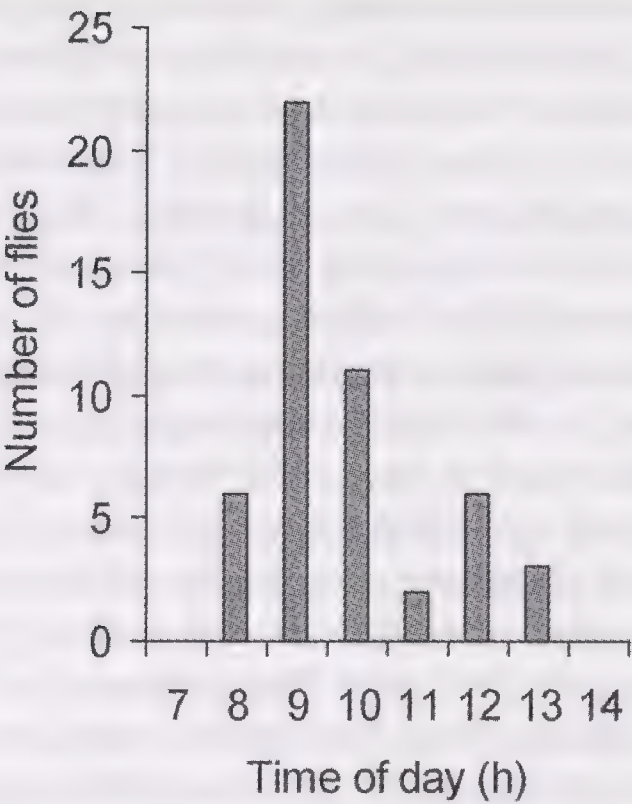


Figure 2. Time of day at which adults of *Bombylius major* were first seen.

DISCUSSION

The original aim of this study was to obtain a measure of the parasite load of *B. major* on *A. cineraria* at the author’s garden in Burrridge. While the result for the rate of parasitism may have been unreliable, the exercise did result in useful quantification of the emergence pattern of *B. major*, which has not been reported before.

Accuracy of counts

The count of 164 *B. major* was thought to be close to the actual value. Some pupal exuviae may have been overlooked among grass or blown away in the almost constantly windy conditions throughout April 2013 but most were thought to have

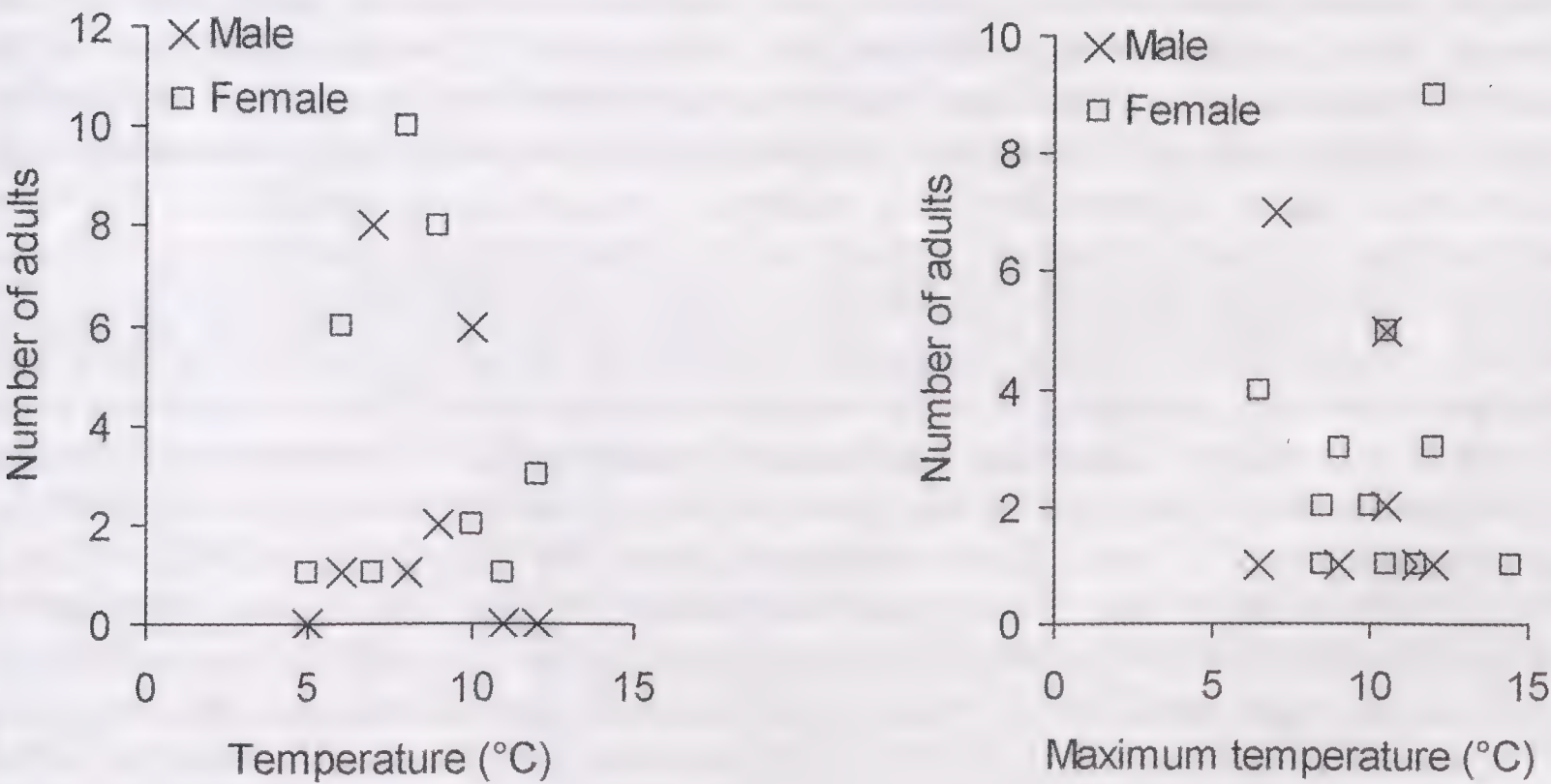


Figure 3. Temperature at which *Bombylius major* emerged on any day (left) and the number of adults emerging at different maximum morning temperatures over the entire emergence period (right).

been collected. A good indication that not many exuviae had been missed was that few were recovered in the final thorough search compared to numbers found in a similar search three days earlier. Exuviae in an exposed position probably take several weeks to decompose, as one survived for 17 days on the bank in the previous year before disappearing after heavy rain and wind (Drake, 2013). Over the short period of this study, most lost exuviae were more likely to have been blown away by the wind rather than disintegrated but there is no way to estimate this.

The disparity between the very few adult bombyliids seen at any one time and the large number that developed in the bank was highlighted in the study of another colony of *B. major*, *B. discolor* and *A. cineraria* (Drake, 2013). The same was seen at the Burridge colony: numerous known emergences but at most three females seen at the bank at any one time (and up to seven probably different individuals in the rest of the garden at the maximum count). Bohart, Stephen & Eppley (1960) also recorded this disparity, noting that “several hundred flies may emerge from 2 or 3 square yards of soil, [but] rarely are more than one or two adults seen hovering over an area of the same size.” The occasional observations of powerful-flying widely dispersing adult flies can therefore give a false impression of larval densities. Even using counts of pupal exuviae may give underestimates, as the figure of 120 *B. major* quoted (Drake, 2013) for the much larger bee colony studied in the previous year is clearly far smaller than would now be expected based on the experience of intensively searching the relatively small garden bank.

The estimated number of bees making holes in the bank was about 930 individuals; presumably these were made by nesting females, so the total count of both sexes was twice this number. While this was felt to be unrealistically high, the previous comment about the disparity between adults seen and more accurately counted artefacts supports the conclusion that this value is probably about right.

Rate of parasitism

To obtain a rate of parasitism, several assumptions were made. The assumption most likely to introduce large error was that the population of both bees and its parasites remain steady from year to year so that the rate of parasitism can be estimated from counts of host and parasite in any year. Conflicting reports of the stability of bee colonies come from Polidori *et al.* (2005) who found that the number of bees and the extent of a colony of *Andrena agilissima* (Scopoli) remained very similar for at least 11 years despite a moderate parasite load, and Litt (1988) who described the rise and decline of a colony of *A. fulva* (Müller) which he attributed to the initial scarcity of parasites, including *B. major*, and their appearance later. The Burridge colony of *A. cineraria* appeared anecdotally to be far smaller in 2013 than in the previous year so may not have been in a steady state. This is important since the rate of parasitism should be applied to the cohort that was attacked. There is some evidence that *B. major* may take two years to develop (Paxton & Pohl, 1999) so flies emerging in 2013 may have developed from bee eggs laid in 2012 or 2011. Clearly it would have been more sensible to count the bees one or two years before counting the flies but the author's interest is primarily in flies and the opportunity to undertake the study was, like so much amateur work, unplanned and opportunistic.

The second assumption is that one bee-fly can complete its development by eating one bee larva, which several authors have assumed. Bohart *et al.* (1960) and Frick (1962) provided the most reliable information on consumption as they excavated nests and followed the growth and behaviour of individual larvae of *Heterostylum robustum* in North America. These fly larvae ate one whole bee larva and about half

of a second larvae, but there were regional differences ranging from 1 to 1.5 bee larvae consumed in two different areas. Frick (1962) found only a very small percentage of bee-fly larvae attacked a second bee larva. Paxton & Pohl (1999) were unsure whether the ratio was 1:1 for *B. major* and *A. fulva* but assumed this in their estimate of parasitism, as did Paxton *et al.* (1996) for *B. major* and *A. scotica*. This ratio was therefore assumed in the present study. The final assumption was that the estimate of the number of *A. cineraria* at the Burrridge colony was accurate but, as it was based on counts of holes that may have included exit burrows as well as new nest holes, may have had a large and unknown error.

With these limitations in mind, the bees suffered a parasitism rate of 7.9% (assuming 1860 bees of both sexes plus 160 killed by *B. major*). This is larger but not too dissimilar to values in other studies, so appears to be possibly accurate (Table 1). Limitations of the data presented by other authors are probably as serious as for the present estimate, as several were based on a few excavations and low numbers of larvae found, or small numbers of bombyliids captured in emergence traps. These parasite loads are smaller than given by Frick (1962) for the North American *H. robustum* on *N. melanderi*; two sets of soil samples gave parasitism of 12.1% and 9.5%, and emergence traps gave 18.1%, while Bohart *et al.* (1960) quoted parasitism of 20–40% (and up to 90%).

Andrena cineraria at the Burrridge colony suffered further depredations. Oil beetles (*Meloe violaceus*) were far more numerous than noted in previous years although they have been seen in the garden for many years. They were counted at the same time as the bombyliids; counts on most days in the bombyliid’s emergence period there were 0–9 and the highest counts were 20–22 individuals between 10–12 April. It is likely that these counts underestimate true numbers by many times, so a *Meloe* population of about 100 adults seems possible (John Walters, pers. comm.). Their triungulin larvae were exceedingly abundant on dandelion flowers (*Taraxacum*) from about 25 April. *Nomada lathburiana* (Kirby) is the bee cleptoparasitic on *A. cineraria*. It was less frequent in 2013 than in the previous year but no reliable counts were made. Finally, a robin that patrolled the hedge was seen eating an *Andrena*, and many headless corpses were found, perhaps eaten by dunnocks as well as the robin. An estimate from the counts of corpses in five of the ten random quadrats set up to count bee-holes suggested that at least 100 bees had been killed by birds. It seems likely that 2012 may have been an exceptional year for *A. cineraria* and the large parasite load in 2013 reflected this. Certainly, the colony appeared to have suffered.

Table 1. Percentage parasitism of *Bombylius* on *Andrena* in several studies. The estimates include one bee eaten for each individual of *Bombylius* and ignore other bees that may have been hosts in the same communal nests in the study by Fellendorf *et al.* (2004).

Bombylius	Andrena	Parasitism	Country and comments	Source
<i>B. major</i>	<i>A. cineraria</i>	7.9%	England	This study
<i>B. major</i>	<i>A. fulva</i>	3.0%	Wales	Paxton & Pohl, 1999
<i>B. major</i>	<i>A. scotica</i>	6.1%	Sweden. The data appear to give a value of 7.5%.	Paxton <i>et al.</i> 1996
<i>B. major</i>	<i>A. vaga</i>	1.6%	Germany. Based on combined data for four traps.	Fellendorf <i>et al.</i> 2004
<i>B. fimbriatus</i>	<i>A. agilissima</i>	“very low”	Italy. So infrequent that no counts were obtained.	Polidori <i>et al.</i> 2005

By comparison, the huge nearby colony that was studied in 2012 (Drake, 2013) appeared to be less affected, despite many *Bombylius major*, *B. discolor* and *N. lathburiana* (but no *Meloe*) being present.

Emergence behaviour of *B. major*

The emergence of *B. major* does not appear to have been followed through its whole period before. The period lasted at least 17 days at Burrridge although the beginning was almost certainly missed. It encompassed mainly cold and often rainy days but this did not appear to interfere with emergence. For example, five adults emerged on 13 April in driving rain and at a temperature of 6.5°C. Emergence in 2013 was far later than in most years as the spring was the coldest since 1963 but the duration of the period was presumably normal.

A slightly earlier emergence flight period of males was suggested for *B. discolor* by Gibbs (2004) as he recorded more males than females early in the flight period. There seem to be no other reports of protandry in *Bombylius* but Frick (1962) found *H. robustum* males collected in emergence traps were on average 3.9 days earlier than females. While many more females were noted in the Burrridge garden later in the flight period, it is curious that the last individuals seen were a mating pair on 7 May before cold wet weather lasting for nine days put an end to the flight period. This male had probably survived at least two weeks before mating, on the assumption that it emerged at the end of the period of male emergence (21 April) at the Burrridge colony, although it may have originated from elsewhere with a slightly different flight period. Such a life-span is far longer than recorded by Du Merle (1966) for *Villa cana* Meigen (as *V. quinquefasciata* Wiedemann in Meigen) which averaged 4 days with a maximum of 6 days. Cold conditions in British springtime may extend the life-time of adults compared to the fast and furious life-style experience by *Villa cana* in midsummer in warm continental Europe.

Morning emergence may be usual in bombyliids. The present results showed a clear morning emergence for *B. major*, peaking between 9:00 and 11:00h British Summer Time (i.e. one hour later than celestial time). Bohart *et al.* (1960) gave identical times for the North American *H. robustum* in a far warmer climate. Morning emergence was reported for *B. discolor* by Walrecht (1950) and Gibbs (2004) who found eight females at 8:10h and more until 10:13h but none after this time. The cue used by *B. major* for emerging from the underground darkness is unclear since temperature was not implicated at Burrridge. In their description of how *Heterostylum* forces its way to the surface, Bohart *et al.* (1960) made no mention of the cue for emergence, nor of the pupa moving to a position where it would be aware of light intensity before finally breaking the surface, although larvae did migrate from deep in the soil to within 5–9cm of the surface before pupating. Once *Bombylius* have emerged, their feeding and oviposition appear to be influenced mainly by temperature and sunshine so that these activities continue well into the afternoon, for instance, a female was feeding on primrose (*Primula vulgaris*) at 18:00h in warm sunny conditions on 6 May. In two studies of adult *Bombylius* daily behaviour in Italy, Andrietti, Martinoli & Rigato (1997) and Boesi, Polidori & Andrietti (2009) recorded a concentration of oviposition activity at about midday, with most taking place between 11:00h and 14:00h, but flowers were visited for a much longer period between 9:00h and 17:00h. Pupal and adult activity patterns are therefore markedly different.

Cold conditions may not have affected emergence but it did affect subsequent flight. Knight (1967) tested the temperature threshold for flight in *B. major* by

gradually warming them up in a glass container kept in his cellar, free of other sources of warmth. The flies stopped flying at nearly 17°C (62°F) and stopped walking at about 12°C (54°F). The maximum temperature in the shade at Burr ridge in the morning emergence period (before 13:00h) averaged 10°C, with extremes of 3.5°C and 15°C. If Knight's values are accurate, then clearly the Burr ridge adults would have been unable to fly without the rather scarce appearances of the sun during spring 2013; for example, three adults scarcely moved position in such conditions and were found the following day in the same place where they had roosted in the dull evening drizzle. On the few occasions when the flies almost certainly flew away, rather than were eaten by birds, the air temperature was at most 12°C with weak sunshine. The more meaningful value of temperature in the sun at ground level was clearly higher than this but was not measured.

Gibbs (2004) noted that *B. discolor* adults disappeared from their emergence site then returned to oviposit several weeks later. A similar pattern was seen in *B. major* at Burr ridge. There was no overlap between the 13 day period of female emergence and the 13 day period of oviposition; the periods were separated by two days. None was seen at flowers in the garden until the first was seen ovipositing. It therefore appears that the flies leave their development site for about two weeks before returning, although it could be shorter for late-emerging females. This assumes that the ovipositing females originated from the bank but, even if they came from elsewhere in the neighbourhood, the timing of their behaviour is likely to have been similar. Casual observations of a large colony 2km away suggested that *B. major* was emerging in rough synchrony with the Burr ridge colony. The adaptive advantage of delaying the return to the development site is to time oviposition with the emergence of *Andrena*, which began about a week before oviposition started, so that there were plenty of active bees by the time the flies were seeking oviposition sites.

Emergence was clearly a vulnerable time for *B. major*. Cold wet weather did not appear to cause problems but bird predation was likely to have been high. In the cold and mainly overcast condition of April 2013, the flies appeared to take on average between 82 and 107 minutes to reach a state when they could fly. However, as no fly was followed from emergence to its maiden flight taken under its own volition, the time to develop to a state fit to fly was unknown and the values given were thought to be underestimates owing to the probable high loss due to bird predation shortly after their emergence. In cold (<10°C) sunless conditions, several flies disappeared just tens of minutes after emerging and the rapid disappearance of many flies in poor weather strongly suggested that birds did eat them. When the flies were prodded they were unable to do more than shuffle about in the cold conditions of most mornings, so they would have been easy prey for birds. It was not possible to quantify the predation but at least half of the adults disappeared quickly in cold overcast conditions that were unsuitable for flight. Bohart *et al.* (1960) and Frick (1962) reported high predation of *Heterostylum robustum* by North American robins, blackbirds, magpies, meadow larks and English sparrows, and they regarded bird predation as the most important source of mortality of the flies; birds ate many of the bees too. Although the eclosed *B. major* sat still and moved only a few centimetres from their exuviae, they were obvious to the human observer and were likely to have been easy pickings to a sharp-eyed bird, particularly in front view when they are brilliantly shining white when they first emerge. They probably moved the shortest possible distance (averaging 5.25cm) to remain inconspicuous. Only one fly was seen actually emerging, and this took nearly 6 minutes from when it was first seen with its head poking out to when it had struggled free of the exuviae, and another 3.25

minutes before it had found a perch about 5cm away and stopped moving, at 7°C. This time was probably plenty for birds to see the movement, and high predation in these first few minutes may partly account for the three-fold discrepancy between the number of adults seen (50) and pupal exuviae collected (153).

This study raised more issues that could be investigated. Prime among these relate to what happens underground for perhaps up to two years. The feeding behaviour of the larvae is unknown – how many bees are eaten by each fly larvae? The cue for emergence is unclear, both for the start of the period and how the pupae know that it is mid-morning. I have no intention of standing in the road digging up my garden bank, and hope that others will try to answer these questions.

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SHORT COMMUNICATIONS

Recent changes to the British list of the Hemiptera-Heteroptera. – I recently published an addendum to Southwood & Leston (1959) (Ryan, 2012), listing the species that have been added to the British list, and those whose names have changed since its publication, based upon the modern Palaearctic Catalogue of the Hemiptera-Heteroptera (Aukema & Rieger, 1995–2006). There is now a supplement to this catalogue (Aukema, Rieger & Rabitsch, 2013), and some of the taxonomic changes presented in this work are relevant to the British species.

Phylus palliceps Fieber (Miridae) (*Phylus pallipes* Fieber of Southwood & Leston) is now regarded as a synonym of *P. melanocephalus* (Linnaeus) (Pagola-Carte, Zabelegui & Ribes, 2005), and is therefore deleted from the British list. This is the second deletion from the list of Southwood & Leston, the first being *Myrmedobia bedwelli* China (Microphysidae), which became a synonym of *M. coleoptrata* (Fallén) (Aukema & Rieger, 1995–2006). The two subspecies of *Glaenocoris propinqua* (Fieber) (Corixidae) have been raised to specific rank, leading to the addition of *Glaenocoris cavifrons* (Thomson) to the British list (Jansson, 2000). Similarly, *Cimex columbarius* Jenyns (Cimicidae) must be added, which was regarded as a subspecies of *C. lectularius* Linnaeus by Southwood & Leston. In addition to these taxonomic changes, a recent arrival to Britain, *Tropidosteptes pacificus* (Van Duzee) (Miridae), can be added to the British list (Bantock & Stewart, 2013). The combination of the foregoing additions and deletions leads to the historic British list now totalling 595, although this includes fifteen species with no modern British records (Ryan, 2012), so the current British list is likely to be somewhat shorter than this.

There have also been some name changes, due to the revision of some genera and subgenera. *Holcostethus strictus* (Fabricius) (Pentatomidae) is now *Peribalus strictus* (Fabricius). The genus *Myrmedobia* Baerensprung (Microphysidae) is now a subgenus of *Loricula* Curtis, its four British species now becoming *Loricula coleoptrata* (Fallén), *L. distinguenda* (Reuter), *L. exilis* (Fallén) and *L. inconspicua* (Douglas & Scott). The subgenus *Neolygus* Knight, of *Lygocoris* Reuter (Miridae), has been raised to generic rank, its three British species now being known as *Neolygus contaminatus* (Fallén), *N. populi* (Leston) and *N. viridis* (Fallén). *Cryptostemma waltli* (Fieber) (Dipsocoridae) is now *Pachycoleus waltli* Fieber, having been moved back to its original genus.

In case it is of use to the reader, I have compiled the current British list, with the corresponding names of Southwood & Leston, as a file in Portable Document Format (PDF) and placed it on the internet. This can be downloaded using the link: <https://sites.google.com/site/robryanhp/BritishListOfHeteroptera.pdf>. The list is also available as a Microsoft Excel spreadsheet, which can be downloaded by replacing “.pdf” with “.xlsx” in the above link. – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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Nest decoration by *Osmia bicolor* (Schrank) (Hymenoptera: Megachilidae) at Brown's Folly, Somerset. – According to Falk (1991) *Osmia bicolor* is a localised thermophilous bee of southern Britain. Since then there has been some evidence of localised range expansion, although Baldock (2008) regarded the situation in Surrey as unchanged in more than a century. The B.W.A.R.S. website provides current national distribution details.

It is well known that *O. bicolor* nests in snail shells, dominantly those of the larger helicids, and that it tends to favour insulated sites on chalk and limestone. The shells are covered with an arrangement of dry grass stems and other plant material; once completed, they are often overlooked and there seem to be few published pictorial records of the construction process. The purpose of this short note is to bring forward three images detailing various aspects of nest coverage observed at Brown's Folly, an Avon Wildlife Trust Reserve near Bathford, Somerset (VC6, ST793362) on 8 June 2013 from about 1400 h B.S.T.

The site selected by the female bees was in thin, sparse herbage near a path on Jurassic limestone and two nests were found one metre apart. One of the utilised snail shells was easily recognisable as that of *Cepaea nemoralis* (L.) (Plate 11, Fig. 1). The bees foraged for nest covering material over a radius of 15 metres from the nest but usually much less and selected grass stems from 2–15cm in length and of a width that could be secured by the mandibles (Plate 11, Figs. 1 & 2). Each stem was carefully positioned and sometimes adjusted for fit (Plate 11, Fig. 2); the bees therefore demonstrated cognisance of their work. Over a period of 30 minutes the average time taken by one bee to complete the collecting cycle was 29 seconds and throughout that time the work was uninterrupted and continuous. Sometimes the bees used other items of plant material such as dry shed bud-scales of beech *Fagus sylvatica* L. (Plate 11, Fig. 3) and Michener (2000, citing Westrich) refers to the use of pine needles in some localities. It is a point of interest how the use of beech bud-scales is favoured over a wide area of Britain (Baldock, 2008). – JAMES A. WHITEHEAD, Widcombe Crescent, Bath, Somerset BA2 6AH and PAUL F. WHITEHEAD, Moor Leys, Little Comberton, Pershore, Worcestershire WR10 3EH.

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EUONYMUS SCALE *UNASPIS EUONYMI* (HEMIPTERA: DIASPIDIDAE); AN INTRODUCED PEST OF SPINDLE (*EUONYMUS*) IN BRITAIN

A. SALISBURY¹, C. MALUMPHY² & A. J. HALSTEAD¹

¹Entomology, Royal Horticultural Society's Garden, Wisley, Nr Woking, Surrey, GU23 6QB
Email: advisory_entomology@rhs.org.uk

²The Food and Environment Research Agency, Sand Hutton, York YO41 1LZ
Email: chris.malumphy@fera.gsi.gov.uk

ABSTRACT

The euonymus scale *Unaspis euonymi* (Comstock) is a pest of spindle (*Euonymus* spp.) which can cause plant death. A native of South East Asia, it became established in Britain in the late 1950s but did not become widespread in England until the 1990s and 2000s. The distribution, identification, life cycle, natural enemies and host range of this pest are outlined, and its status and control in Britain discussed.

INTRODUCTION

The euonymus scale, *Unaspis euonymi* (Comstock) (Diaspididae) is native to temperate Eastern Asia (Pellizzari & Germain, 2010) and was first recorded in Britain in 1936 (Anon., 1939; Dennis, 1969). During the last two decades it has dramatically expanded its geographical range and become more abundant in Britain. It feeds by sucking the sap from the stems and foliage of its host plants, usually *Euonymus* spp., and is one of the most damaging scale insects found in Britain. The purpose of this communication is to highlight the increase in frequency and distribution of *U. euonymi* in Britain, and to review its biology and control.

IDENTIFICATION

Unaspis euonymi was originally described in the genus *Chionaspis* by Comstock (1881) from specimens collected from Norfolk, Virginia, USA, on *Euonymus latifolia*; it has been re-described and illustrated by Balachowsky (1954), Ferris (1937), Kosztarab & Kozár (1988), and Miller & Davidson (2005). It is a sexually dimorphic species; the adult female scale covers are oyster-shell shaped, dark brown and slightly convex reaching 2.2mm in length whilst the exuviae are terminal and brownish yellow. Male tests (protective covers for the immature stages) are 1.0mm long, white, felted elongate oval with three longitudinal ridges; the exuviae are terminal and brownish yellow like the females (Plate 12, Figs. 1–4). Adult males have a single pair of wings and resemble small flies. Male tests predominate on the leaves and female scales on stems and branches.

Unaspis euonymi is the only *Unaspis* species currently established in Britain and the only diaspidid scale likely to be encountered on *Euonymus*; *U. citri* (Comstock) is a quarantine listed pest for the European Union (EPPO/CABI, 1997) and is occasionally intercepted on *Citrus* plants and fruit, and *U. yanonensis* (Kuwana) has become established in parts of France and Italy, and is also found on citrus (Smith *et al.*, 1992; The Food and Environment Research Agency (FERA) data).

LIFECYCLE

Several studies investigating the lifecycle of *U. euonymi* show that there are usually two generations a year, although three can occur (Dennis, 1969; Kosztarab & Kozár, 1988; Savopoulou-Soultani, 1996; Özyurt & Ülgentürk, 2007). The scale reproduces sexually and overwinters as mated females, although nymphs can also be present throughout the winter. In May each female produces 30–70 eggs which hatch after one or two days. These eggs hatch into nymphs which become adults from mid-June to July. Eggs of the second generation are present from late June and the new generation of adults from September. The lifecycle varies between years depending on climatic conditions.

DISTRIBUTION

Unaspis euonymi is native to temperate Eastern Asia (Pellizzari & Germain, 2010) but is now found in nearly all warm temperate regions where euonymus is grown (Davidson & Miller, 1990). In Britain *U. euonymi* was first reported in 1936 from Shropshire (VC40) on *Euonymus* plants imported from Spain (Anon, 1939; Dennis, 1969). It was not reported again until 1952 when ‘very severe damage’ was reported on several shrubs in a Southampton garden (South Hampshire VC11) (MAF, 1952). The Royal Horticultural Society first received a report on euonymus in 1955 from New Milton, Hampshire (RHS data). The lack of reported cases in Britain between 1936 and 1952 suggests that *U. euonymi* did not become established in Britain during that time. In 1960 an infestation caused the decline and death of *Euonymus japonicus* hedges in Swanage (Dorset, VC9) (Dennis, 1969). Dennis assumed that the scale had been imported with the plants from somewhere in Europe and that infestations in Britain were a result of importation. However, a further five records from the southern counties during the 1960s, in South Hampshire (VC11), Dorset (VC9) and East Sussex (VC14) (RHS and FERA data), indicate that the scale had become established along the south coast of England. Diaspidids are highly cryptic and it usually takes several years before the scale populations reach damaging levels and are noticed (Malumphy, 2011). It is therefore likely that *U. euonymi* became established along the south coast in the 1950s. In the 1970s the scale was reported seven times, including the first records for Cambridgeshire (VC20) and the Isle of Wight (VC10) (RHS and FERA data). During the 1980s the scale was reported on 13 occasions, mostly from counties where it had previously been reported, and for the first time from East Kent (VC15) in 1989. During the 1990s *U. euonymi* became a more frequent pest, being reported to FERA and the RHS on 41 occasions, adding Surrey (VC17), Middlesex (VC21), Berkshire (VC22), West Kent (VC16) and Edinburgh (VC83) to the list of areas with reported cases. Between 2000 and the end of 2012, 154 reports of the scale were received. It is now widespread in England, with the exception of the south west, and has been recorded as far north as South East Yorkshire (VC61). There are scattered reports from Wales (Fig. 1) and only one from Scotland, Kirknewton, Edinburgh in 1996, although it is not known if the pest has established in Scotland. The upward trend in the number of enquiries is clearly represented in a summary of the proportion of enquiries received by the RHS advisory service (Fig. 2).

HOST RANGE, DAMAGE AND CONTROL

Unaspis euonymi exhibits a strong preference for *Euonymus* although it has been recorded on 18 genera in 13 plant families (*Buxus*, *Camellia*, *Celastrus*, *Daphne*,

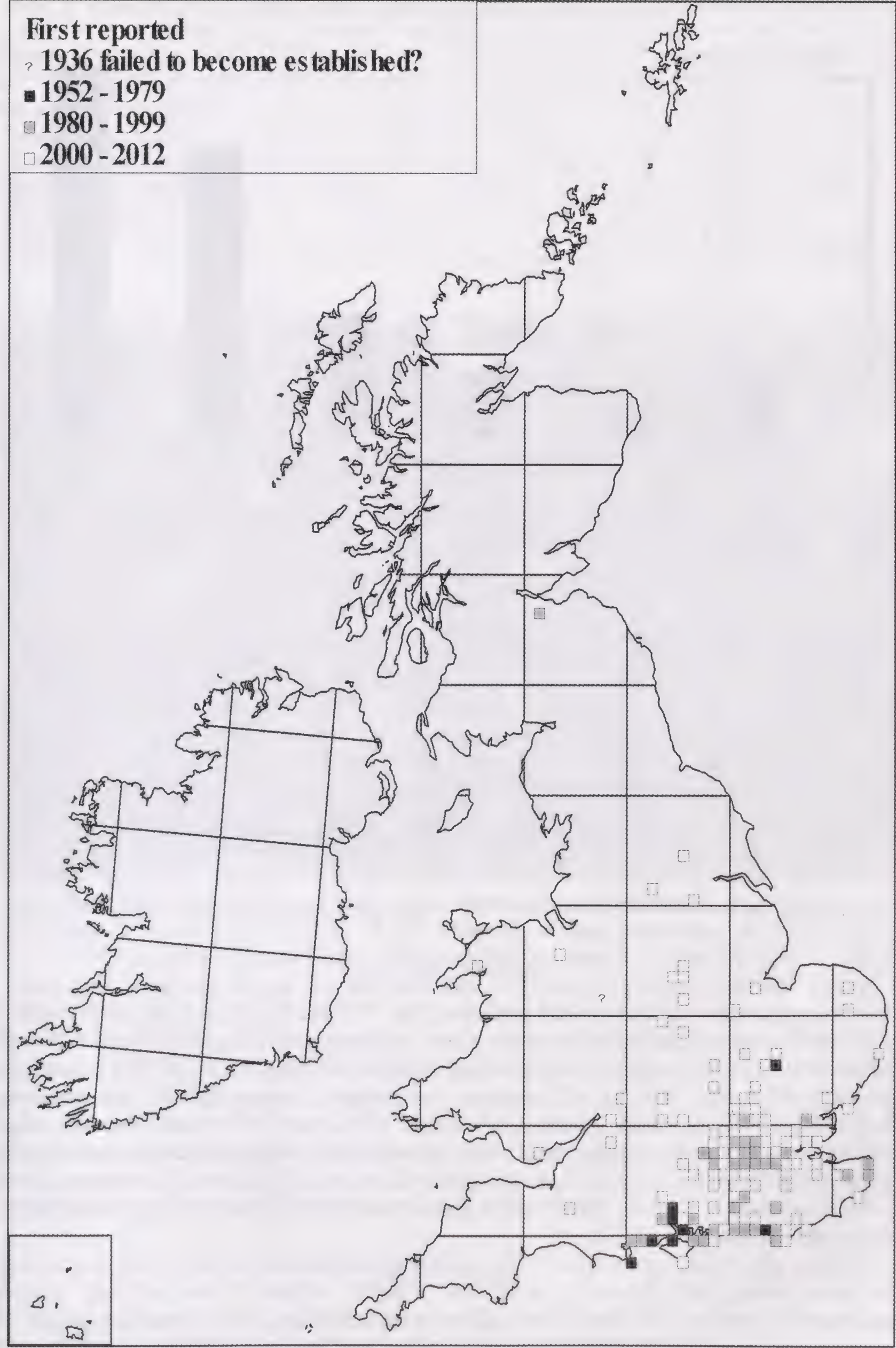


Fig. 1. Distribution of the Euonymus scale, *Unaspis euonymi* (Comstock) in Britain, 1936 to December 2012. RHS and FERA data. Produced using Dmap©.

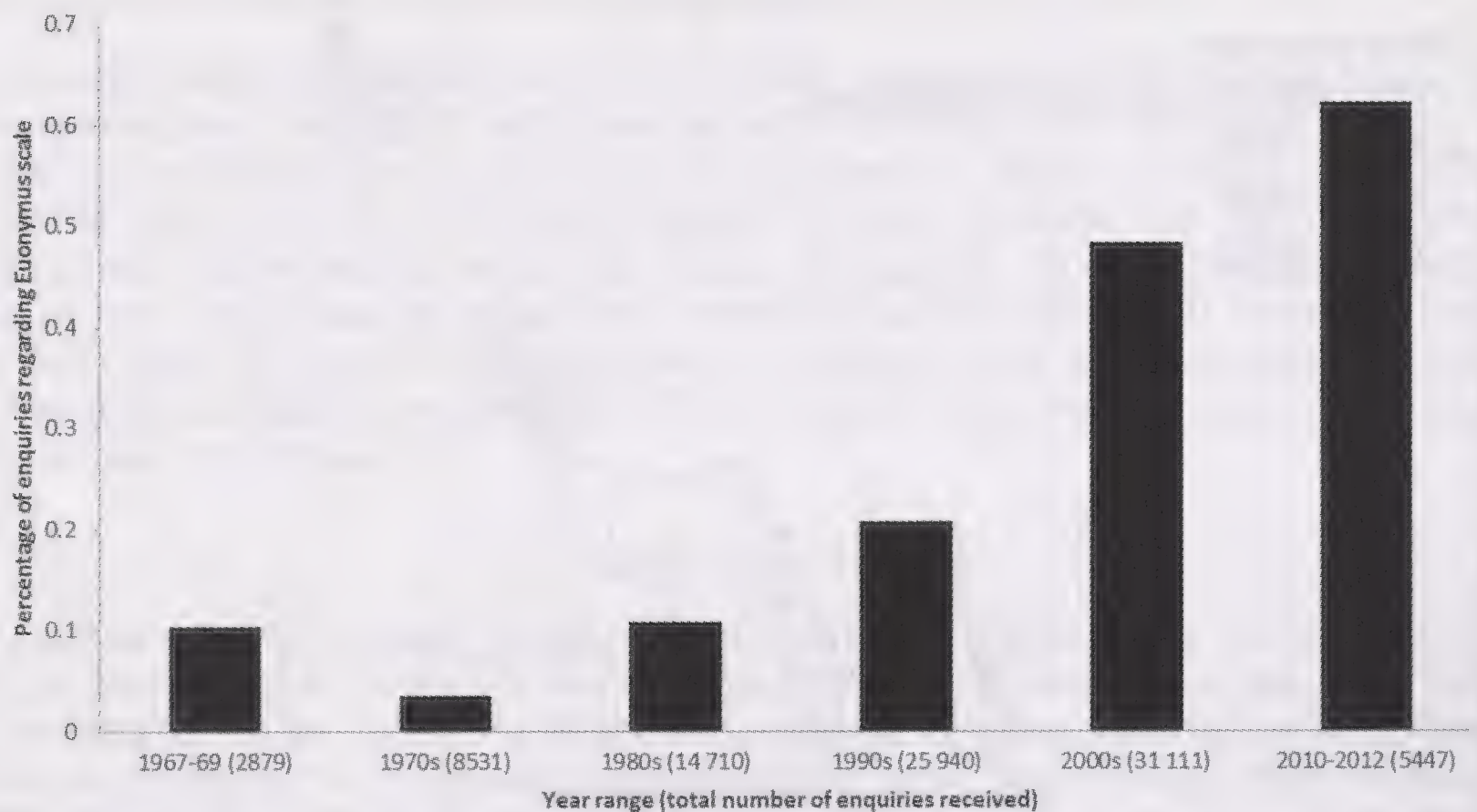


Fig. 2. Euonymus scale (*Unaspis euonymi*) enquiries as a percentage of total pest enquiries received by the RHS Advisory Service (1967 to 2012; reliable total number of enquiries data is only available from 1967).

Eugenia, *Euonymus*, *Hibiscus*, *Ilex*, *Jasminum*, *Ligustrum*, *Lonicera*, *Olea*, *Pachistima*, *Pachysandra*, *Perychmenum*, *Prunus* and *Syringa*) (Kosztarab & Kozár, 1988). In Britain it has rarely been found on plants other than *Euonymus* with only one of the 274 records of *U. euonymi* reported on an alternative plant, *Lonicera japonica* (Table 1). The most frequent host plant reported in Britain is Japanese spindle *Euonymus japonicus* (Thunberg) and its cultivars although this may be because this is the most commonly planted *Euonymus* in ornamental situations. It is likely that most *Euonymus* species can be attacked, although susceptibility of different species and cultivars varies; in designed field and container studies in Virginia, USA, significantly lower levels of euonymus scale were observed on *Euonymus kiautschovicus* 'Manhattan', *E. japonicus*, and *E. fortunei* and *E. alatus* compared to *E. japonicus* 'Albomarginatus' and *E. japonicus* 'Microphyllus' (Jefferson & Schultz, 1995).

Heavy infestations of *U. euonymi* can encrust all aerial parts of the plant, obscuring the stem and lower leaf surfaces (Fig. 3; Plate 12, Figs. 1 & 2). The males and females infest different parts of the plant, with males primarily on the leaves and females mostly on the stems and branches (Özyurt & Ülgentürk, 2007). Leaves can become chlorotic, due to chloroplast destruction, especially in the palisade parenchyma cells (Cockfield, Potter & Houtz, 1987). Leaves often drop prematurely, leaving plants sparsely foliated and with the remaining foliage concentrated at the tips of branches. This leads to lack of vigour, dieback and in severe infestations plant death (Cockfield & Potter, 1986; Van Drieshe *et al.*, 1998; Özyurt & Ülgentürk, 2007; Malumphy & Badmin, 2012).

Infested plants can be sprayed with approved insecticides in May and July, when the more vulnerable crawler nymphs are present, although this will not always eradicate the pest or save host plants (Davidson & Miller, 1990). Another option is to grow species or cultivars of *Euonymus* that are less susceptible to *U. euonymi*. This has been found to be the only reasonable approach in parts of the USA (Davidson & Miller, 1990).

Table 1. Reported hosts of Euonymus scale (*Unaspis euonymi*) in Britain (RHS & FERA data)

Host	Number of reports (%)
<i>Euonymus</i> unspecified	173 (63)
<i>Euonymus fortunei</i>	5 (2)
<i>Euonymus japonicus</i>	93 (34)
<i>Euonymus europaeus</i>	2 (0.7)
<i>Euonymus hamiltonianus</i>	1 (0.4)
<i>Lonicera japonica</i>	1 (0.4)



Fig. 3 *Euonymus* stems (*Euonymus* sp.) encrusted with *Euonymus* scale (*Unaspis euonymi*). FERA ©

NATURAL ENEMIES

Seventeen species of hymenopterous parasitoids, six predatory beetles and five species of predatory mite have been found in association with *U. euonymi* (Ben-Dov, Miller & Gibson, 2013). Lacewing (*Chrysoperla* sp.) larvae were found to feed on the prepupa and pupal stages of euonymus scale in Turkey but had no impact on infestations (Özyurt & Ülgentürk, 2007). In Britain, the kidney spot ladybird, *Chilocorus renipustulatus* (Scriba) (Coleoptera: Coccinellidae) is often found feeding on *U. euonymi* (Kirby, 2008), and a predatory mite (*Anystis* sp., Anyslidae) has been reported in association with *U. euonymi* (Dennis, 1969).

DISCUSSION

Euonymus scale, *U. euonymi* has been established in Britain since the 1950s. It has spread from the south coast to become widespread in England and has become a frequently reported problem on *E. japonicus*. Heavy infestations of this pest can kill its host plants and it is likely that it will spread to most of Britain. Currently, control

of the scale insect is limited to the use of insecticides or the growing of resistant cultivars. However, the interactions of the scale with its natural enemies are poorly known and may be worthy of further investigation.

ACKNOWLEDGEMENTS

The authors would like to thank Anna Platoni for commenting on the manuscript and Dawn Edwards for checking botanical nomenclature.

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PLATE 9. Fig. 1. Ventral view of adult male of *Coranus aethiops*. Fig. 2. Ventral view of adult male of *Coranus subapterus*. Fig. 3. External view of right paramere of *Coranus aethiops*. Fig. 4. External view of right paramere of *Coranus subapterus*.

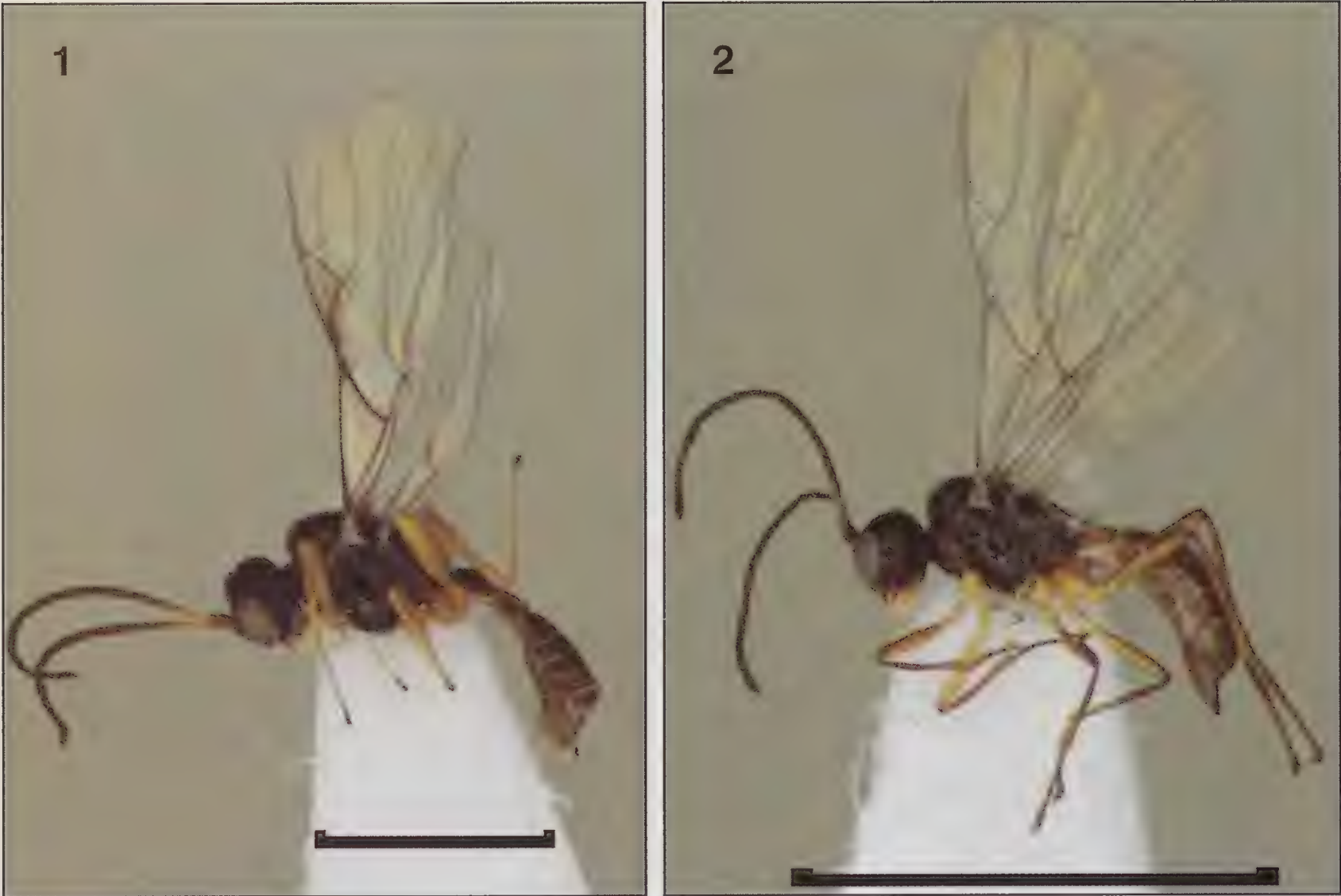


PLATE 10. Fig.1: Adult female *Areopraon silvestre* (Stary). Fig. 2: Adult female *Praon necans* Mackauer. Fig. 3: Mummies of the aphid *Rhopalosiphum nymphaeae* on *Nymphaea alba*, parasitized by *Praon necans*. Mackauer.



PLATE 11. Figs. 1–3. Female *Osmia bicolor* (1) bringing dry herbage to its nest inside the shell of *Cepaea nemoralis*, (2) using combinations of lift, tilt and leverage to insert a dry grass stem into its nest cover, and (3) approaching its nest with shed bud-scale of beech *Fagus sylvatica*. 8 June 2013. Photos: © J. A. Whitehead.



PLATE 12. Figs. 1 & 2: Euonymus stem (*Euonymus* sp.) encrusted with female Euonymus scale, *Unaspis euonymi*. FERA ©. Fig. 3: Euonymus stem (*Euonymus* sp.) encrusted with male and female Euonymus scale, *Unaspis euonymi*. FERA ©. Fig. 4: Euonymus leaf (*Euonymus* sp.) encrusted with Euonymus scale, *Unaspis euonymi*. FERA ©.

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SHORT COMMUNICATION

Drag-Vac – another use of a domestic vacuum cleaner as a suction sampler. – I have previously reported the use of a Vax LiFE handheld vacuum cleaner as a suction sampler in the study of Hemiptera-Heteroptera (Ryan, 2012). This device comes as an ‘unplugged Multipack’ with an upright vacuum cleaner that runs off the same lithium ion battery. Upon buying a second handheld device, I became the owner of another upright vacuum cleaner, and it dawned upon me that I was likely to accumulate an impressive collection of these appliances, as the handhelds inevitably wore out and needed replacement; and so long as Vax insisted on selling the two items together and not separately. Under these circumstances, I felt obliged to make use of the upright vacuum cleaners somehow. My wife was unwilling to give up her Henry, which I believe is another make of vacuum cleaner, so that left field work as the only employment option.

I reasoned that by removing the head of the appliance, which is easy to do, and covering the bare end with the same garden netting used for the handheld, I could drag the device behind me as I walked, whereby it might sample the invertebrate fauna at the roots of vegetation, and do so more conveniently than could be achieved by hand searching or by using my handheld sampler. A trial run of this bizarre contraption was conducted at a secluded spot, out of view from members of the public, and was very successful. Collecting was almost effortless, the headless upright being sufficiently light to be trailed behind me without fatigue for as long as the batteries lasted (an hour for the two batteries I have), but sufficiently heavy and smoothly contoured to cut a wake through the vegetation and keep the bare end close to the ground. The electrical tape used to secure the netting proved resilient to the inevitable abrasion, and the only disadvantage encountered in use was the need to stop occasionally to clear debris from the netting and to check the fill of the collecting chamber. The collecting chamber is easily detached from the appliance, and emptied by putting a plastic bag over the end and pressing the release button. Any large, easily identifiable insects (e.g. shieldbugs) can then be liberated, and the bag sealed and placed in a sandwich box, for later examination of the remaining contents at home under the microscope.

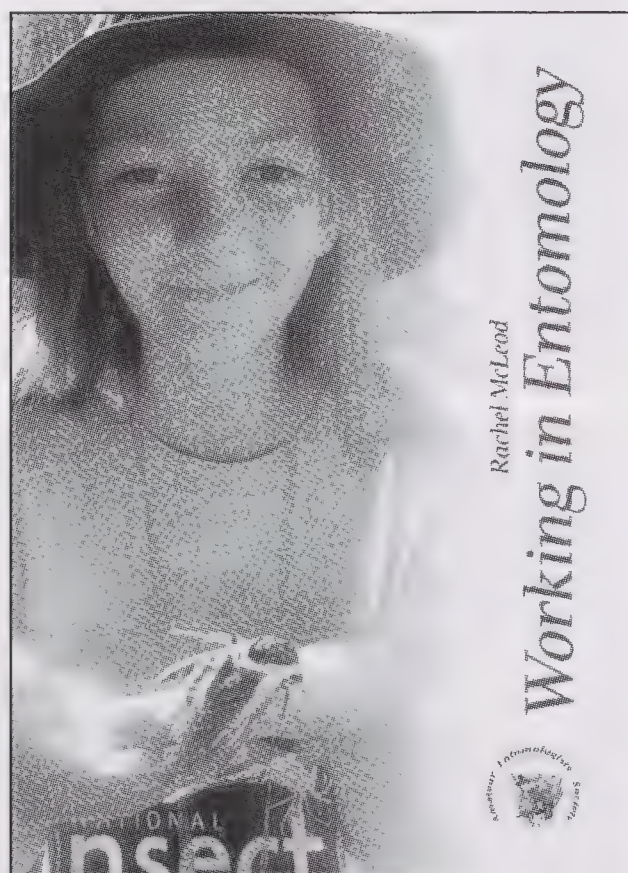
During the late summer of 2012, ‘drag-vac’ (as the application of this towed suction sampler became referred to in my field notebook) was employed on a number of occasions on dry sites in the Chiltern Hills, North Wessex Downs and Cotswolds. The appliance collected a variety of bugs that I had seldom taken sweeping at these sites: the stiltbugs *Berytinus montivagus* (Meyer-Dür), *Berytinus signoreti* (Fieber), *Berytinus minor* (Herrich-Schäffer), *Berytinus clavipes* (F.) and *Gampsocoris punctipes* (Germar) (Berytidae); the shieldbugs *Podops inuncta* (F.) (Pentatomidae), *Thyreocoris scarabaeoides* (L.) (Thyreocoridae) and *Canthophorus impressus* (Horváth) (Cydnidae); the lacebugs *Catoplatus fabricii* (Stål), *Agramma laetum* (Fallén), *Acalypta parvula* (Fallén) and *Kalama tricornis* (Schrank) (Tingidae); the

groundbugs *Heterogaster artemisiae* Schilling and *Megalonotus chiragra* (F.) (Lygaeidae); the capsid bugs *Pachytomella parallela* (Meyer-Dür), *Chlamydatus evanescens* (Boheman) and *Chlamydatus saltitans* (Fallén) (Miridae); and the rhopalid bug *Corizus hyoscyami* (L.) (Rhopalidae). Details of these captures will be published in later articles.

The Vax LiFE upright vacuum cleaner has proven to be a remarkably simple and effective collecting device for those species of Heteroptera that prefer to inhabit the roots of plants, and seldom come within reach of the sweep net. The fact that this appliance is supplied at no extra cost with the extremely useful handheld, must make the 'unplugged Multipack' one of the best entomological bargains available at the moment. – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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Ryan, R. P. 2012. The use of a domestic vacuum cleaner as a suction sampler. *British Journal of Entomology and Natural History* 25: 224–225.



BOOK REVIEW

Working in Entomology by Rachel McLeod. AES Publishing. 2013. Softback. £10.48. ISBN: 978-0-95714-912-0.

I have not reviewed many books about careers in Entomology, let alone one by a 14-year-old, so my curiosity was piqued by this one. In her book *Working in Entomology*, Rachel McLeod interviews a broad range of entomologists about their work, from those at the beginning of their careers to some at the very end, and asks insightful and often amusing questions. The common thread the interviewees share is their passion for the subject matter. Most were academic entomologists, whose time is sadly often taken up by mundane chores, but that did not come across in this book. On several occasions I had a good chuckle at some of

the interviews and I discovered that entomologists have a habit of getting naked!

We are introduced to the subject by Professor Simon Leather, who sets the theme with tales of obsessive behaviour, foreign fieldtrips and how you can end up being paid to study insects. The eight interviews that follow continue happily along this path. Dr Martin Hall whimsically recounts the joy of floating down a Bolivian river on a field trip, while others describe the pleasures of collecting more locally. I didn't necessarily agree with all of the opinions given, but this simply shows how varied opinions can be within one discipline. Rachel summarises the responses at the end of the book to provide a cohesive review interspersed with little facts and titbits.

This is not a book about how to get a career in entomology *per se*, but I think it does offer a series of choices a young entomologist could think about. A fun and comprehensive read that I believe would convince many a young scientist that entomology is a path that deserves to be taken.

ERICA MCALISTER

APHID PARASITOIDS IN WALES

EDWARD A. BAKER

10 Bron Awelon, Barry, Vale of Glamorgan, CF62 6PR
E-mail: edbaker1975@hotmail.com

ABSTRACT

Records of 57 primary and 23 secondary hymenopterous aphid parasitoid species known from Wales are presented as a Checklist and an Appendix cataloguing trophic associations. The list represents a doubling of the known species from the principality.

INTRODUCTION

The species of *Aphelinus* Dalman in the subfamily Aphelininae (Chalcidoidea: Aphelinidae) and all species in the subfamily Aphidiinae (Ichneumonoidea: Braconidae) are obligate, primary endoparasitoids of aphids (Mackauer, Michaud & Völkl, 1996; Noyes, 2012; Sullivan & Völkl, 1999). Adults oviposit in live aphids and the larvae devour the internal tissues until host death occurs, whereupon pupation occurs inside, or for species in the tribe Praini, beneath the mummified aphid cadaver in a silken cocoon (Boivin, Hance & Brodeur, 2012; Tomanović *et al.*, 2006b). The adult excises a circular exit hole in the mummy, or cocoon in the case of Praini.

Over 100 species of Hymenoptera in Britain are obligate, primary endoparasitoids of aphids (Broad, Shaw & Godfray, 2012; Noyes, 2012), with a further 60+ species using aphids as secondary hosts (Fergusson 1980, 1986; Van Veen, 2009; Broad, 2011; Ferrer-Suay *et al.*, 2012; Noyes, 2012), with aphid primary parasitoid larvae being their main or only hosts. If the total predicted fauna of aphid parasitoids in Britain is around 200 species then their diversity is one-third that of the 600 or so aphid species in Britain, estimated using Blackman & Eastop (1994, 2006) and Fauna Europaea <http://www.faunaeur.org>.

Secondary aphid parasitoids may be divided into *hyperparasitoids* and *pseudohyperparasitoids* (Sullivan & Völkl, 1999). In Wales, the former comprise species of *Alloxysta*, *Apocharips* and *Phaenoglyphis* (Cynipoidea: Figitidae: Charipinae) and *Syrphophagus* (Chalcidoidea: Encyrtidae: Encyrtinae). Aphid hyperparasitoids are *koiniobiont endoparasitoids* that oviposit within live primary parasitoid larvae in live aphids (Sullivan & Völkl, 1999). Only after aphid mummification does the hyperparasitoid larva hatch, whereupon it feeds endophagously on the primary larva before pupating and emerging from the mummy as an adult (Sullivan, 1987). The Charipinae are obligate hyperparasitoids of aphids or psyllids (Ferrer-Suay *et al.*, 2012) whereas *Syrphophagus* includes some species that target hosts other than aphids (Noyes, 2012). In addition, *Syrphophagus* shows dual oviposition behaviour, sometimes operating as a hyperparasitoid, but preferentially as a pseudohyperparasitoid, though the larva always feeds endophagously (Sullivan, 1987; Sullivan & Völkl, 1999).

Aphid pseudohyperparasitoids recorded from Wales comprise species of *Asaphes* (Chalcidoidea: Pteromalidae: Asaphinae), *Dendrocerus* (Ceraphronoidea: Megaspilidae), *Pachyneuron* (Chalcidoidea: Pteromalidae: Pteromalinae) and *Syrphophagus*. Aphid pseudohyperparasitoids function as *idiobiont ectoparasitoids* (Sullivan & Völkl, 1999). When the aphid has mummified, venom is injected into the primary parasitoid larva, terminating its development. An egg is then laid on its surface and the larva that hatches feeds ectophagously (except in the case of *Syrphophagus*) on its tissues before pupating and emerging from the mummy as an adult (Sullivan, 1987).

A single species of *Aprostocetus* (Chalcidoidea: Eulophidae: Tetrastichinae), probably *A. clavicornis* (Zetterstedt) (A. Polaszek, pers. comm.), has been recorded as a secondary aphid parasitoid in Wales, but its biology is unknown. Takada and Kamijo (2012) summarise knowledge of the Tetrastichinae as secondary aphid parasitoids world-wide and cite the record in Graham (1987) of *A. clavicornis* from England, reared from the aphid *Drepanosiphum platanoidis* (Schrank) on *Acer pseudoplatanus* parasitised by *Aphelinus thomsoni* Graham.

The only non-hymenopterous parasitoid of aphids known from Europe is *Endaphis perfida* Kieffer (Diptera: Sciarioidea: Cecidomyiidae: Cecidomyiinae). Unlike hymenopterous parasitoids, *Endaphis* oviposits directly on a plant or aphid, and the larva then penetrates the aphid exoskeleton and feeds as a koiniobiont endoparasitoid (Muratori, Gagné & Messing, 2009).

Since 2007 the author has reared and identified aphid parasitoids primarily from Cardiff, the Vale of Glamorgan and Merthyr Mawr Warren National Nature Reserve (NNR) near Bridgend. No systematic recording of aphid parasitoids has been undertaken previously in Wales, or elsewhere in Britain, except as part of localised studies such as Müller *et al.* (1999). Britain lags behind several other European countries like the Czech Republic, where a comprehensive catalogue of Aphidiinae and their associations has been compiled by Starý (2006); and Norway, where a provisional Checklist, including secondary parasitoids, has been produced by Westrum *et al.* (2010).

Aside from their intrinsic ecological importance in studies of biodiversity, aphid parasitoids may play an important role in biological control, but without a detailed knowledge of naturally occurring trophic associations their practical application lacks a sound theoretical basis.

METHODS

Records from Ferguson (1980, 1986), Japoshvili (2007), Baker (2009, 2010), Van Veen (2009), Baker & Broad (2009 & in prep.), Broad (2011), Broad, Shaw & Godfray (2012), Noyes (2012) and Countryside Council for Wales (CCW) were consulted in order to compile the Appendices and Checklist, which were then expanded by the addition of original records by the author.

In relation to the author's own records presented in Appendix 1, aphids were identified using Blackman & Eastop (1994, 2006) and Wojciechowski (2003). Primary parasitoids were identified using Mackauer (1959a, b), Starý (1960, 1966, 1971, 1973, 1978), Starý, Remaudière & Leclant (1971), Graham (1976), Gärdenfors (1986), Pungertl (1986), Tremblay & Pennachio (1986), van Achterberg (1989), Tomanović *et al.* (2003, 2006a, 2007, 2009, 2012), and Kavallieratos *et al.* (2005). Secondary parasitoids were identified using Graham (1969), Dessart (1972), Fergusson (1980, 1986), Tremblay & Pennachio (1986), and Gibson & Vikberg (1998).

Dr Gavin Broad of the Natural History Museum, London (BMNH), identified *Pauesia* spp. reared by the author from *Cinara* spp. and confirmed identifications of several species of Aphidiinae. Dr Željko Tomanović (University of Belgrade) identified *Binodoxys angelicae* (Haliday) and *Monoctonus caricis* (Haliday) and confirmed the identification of *P. yomenae* Takada. Dr Andrew Polaszek (BMNH) identified *Aphelinus* ?*flaviventris* Kurdjumov and *Aprostocetus* ?*clavicornis* and confirmed the identification of *Aphelinus subflavescens* (Westwood) from *Monaphis antennata* (Kaltenbach). David Notton (BMNH) confirmed identifications of some *Dendrocerus* species, and provided information about *Dendrocerus* and *Alloxysta* species records from Wales held at the BMNH. Dr John Noyes (BMNH) identified *Aphelinus abdominalis* (Dalman) and all *Syrphophagus* species. Hannes Baur (Natural History Museum, Bern) identified *Pachyneuron aphidis* (Bouché). Dr

Frank Van Veen (University of Exeter) and Mar Ferrer-Suay (University of Barcelona) identified or confirmed identifications of Charipinae as part of a revision of their taxonomy. Adrian Fowles of CCW (now Natural Resources Wales) gave information about records of aphid parasitoid species in CCW files.

Parasitoid specimens have been deposited with the BMNH, National Museum of Wales, Cardiff (NMW) and the University of Belgrade, or otherwise retained by the author.

The main Checklist comprises parasitoids that have been reared from aphid mummies, captured during oviposition or otherwise captured, and of a species reported in the literature as an aphid parasitoid. Links between primary and secondary parasitoids in Appendix 1 are made on the basis of mummy characteristics, rearing of primary parasitoids from mummies of identical appearance at the same locations and literature data. Some primary parasitoid records in Appendix 1 that do not link with secondary parasitoids have been made on the basis of mummy characteristics only. These species are not included in the list. A second Checklist was compiled of aphid species from Wales known to have been parasitised.

Some historical records of Charipinae held by the Countryside Council for Wales have not been included due to uncertainty regarding the accuracy of the species identifications. *Alloxysta nigrita* (Thomson) is included in the Checklist on the basis of a specimen determined by Mar Ferrer-Suay and sent to the BMNH by Adrian Fowles. The Charipinae are a difficult group but the ongoing taxonomic work by Mar Ferrer-Suay and others should be of great assistance in gaining a better understanding of the British fauna.

RESULTS

Forty-one species of aphid parasitoid were recorded from Wales prior to the publication of this paper, based on the studies of Fergusson (1980, 1986), Japoshvili (2007), Baker (2009, 2010), Baker & Broad (2009 & in prep.), Van Veen (2009), Broad (2011), Broad, Shaw & Godfray (2012), Noyes (2012) and CCW records. The new Checklist (Table 1) increases the total to 80 species as listed below. Species known from Wales prior to the publication of this paper are marked with an asterisk. The total number of parasitised aphid species from Wales is increased to 62 (Table 2).

Details of trophic associations of each parasitoid species based on records from Wales are listed in Appendix 1 and those where no confirmed observations of host aphid(s) or host plants are known are listed in Appendix 2.

DISCUSSION

The Checklist and Appendices represent the first step in elucidating the aphid parasitoid fauna and their trophic relationships in Wales. So far a limited number of hosts and habitats in a small geographical area have been investigated, so it is intended to update the Checklist periodically.

The highest level of species diversity is in the Aphidiinae and Charipinae, which comprise, respectively, obligate aphid primary and hyperparasitoids. Most species in both subfamilies are oligophagous, with smaller numbers of monophagous and polyphagous species. Pseudohyperparasitoids are less diverse and dominated by the polyphagous *Dendrocerus carpenteri* and *Asaphes vulgaris*.

Twelve species of Aphidiinae new to Britain have been found in Wales recently (Baker & Broad, 2009 & in prep.): *Adialytus salicaphis*, *Aphidius setiger*, *Areopraon silvestre*, *Binodoxys brevicornis*, *Ephedrus laevicollis*, *Praon bicolor*, *Praon cavariellae*, *Praon necans*, *Praon spinosum*, *Praon yomenae*, *Trioxys falcatus* and *Trioxys*

Table 1 Checklist of aphid parasitoids in Wales

PRIMARY PARASITOIDS

APHELINIDAE

APHELININAE

- Aphelinus abdominalis* (Dalman)*
- Aphelinus annulipes* (Walker)*
- Aphelinus asychis* Walker*
- Aphelinus fulvus* Yasnosh
- Aphelinus mali* (Haldeman)
- Aphelinus subflavescens* (Westwood)*
- Aphelinus thomsoni* Graham

BRACONIDAE

APHIDIINAE

- Adialytus ambiguus* (Haliday)
- Adialytus salicaphis* (Fitch)*
- Aphidius aquilus* Mackauer
- Aphidius asteris* Haliday
- Aphidius avenae* Haliday
- Aphidius cingulatus* Ruthe
- Aphidius ervi* Haliday
- Aphidius funebris* Mackauer*
- Aphidius hortensis* Marshall
- Aphidius matricariae* Haliday
- Aphidius microlophii* Pennachio & Tremblay
- Aphidius rosae* Haliday
- Aphidius salicis* Haliday
- Aphidius setiger* (Mackauer)*
- Aphidius sonchi* Marshall
- Areopraon silvestre* (Starý)*
- Betuloxys compressicornis* (Ruthe)
- Binodoxys angelicae* (Haliday)
- Binodoxys brevicornis* (Haliday)*
- Binodoxys heraclei* (Haliday)
- Diaeretiella rapae* (M’Intosh)
- Diaeretus leucopterus* (Haliday)
- Ephedrus laevicollis* (Thomson)*
- Ephedrus plagiator* (Nees)
- Falciconus pseudoplatani* (Marshall)
- Lysiphlebus confusus* Tremblay & Eady*
- Lysiphlebus fabarum* (Marshall)
- Monoctonus caricis* (Haliday)
- Monoctonus crepidis* (Haliday)
- Monoctonus ligustri* van Achterberg
- Paralipsis enervis* (Nees)*
- Pauesia pini* (Haliday)*
- Pauesia laricis* (Haliday)
- Pauesia picta* (Haliday)*
- Pauesia unilachni* (Gahan)*
- Praon bicolor* Mackauer*
- Praon cavariellae* Starý*
- Praon dorsale* (Haliday)
- Praon flavinode* (Haliday)
- Praon longicorne* (Marshall)*
- Praon necans* Mackauer*

- Praon spinosum* Mackauer*
- Praon volucre* (Haliday)
- Praon yomenae* Takada
- Trioxys betulae* Marshall
- Trioxys cirsii* (Curtis)
- Trioxys curvicaudus* Mackauer*
- Trioxys falcatus* Mackauer*
- Trioxys pallidus* (Haliday)*
- Trioxys tenuicaudus* Starý*

HYPERPARASITOIDS

ENCYRTIDAE

ENCYRTINAE

- Syrphophagus mamitus* Walker*
- Syrphophagus taeniatus* (Förster)

FIGITIDAE

CHARIPINAE

- Alloxysta arcuata* (Kieffer)
- Alloxysta brachyptera* (Hartig)*
- Alloxysta castanea* (Hartig)*
- Alloxysta citripes* (Thomson)*
- Alloxysta leunisii* (Hartig)*
- Alloxysta nigrita* (Thomson)
- Alloxysta pedestris* (Curtis)*
- Alloxysta piceomaculata* (Cameron)
- Apocharips trapezoidea* (Hartig)*
- Phaenoglyphis longicornis* (Hartig)
- Phaenoglyphis salicis* (Cameron)*
- Phaenoglyphis villosa* (Hartig)*

PSEUDOHYPERPARASITOIDS

MEGASPILIDAE

MEGASPILINAE

- Dendrocerus aphidum* (Rondani)*
- Dendrocerus carpenteri* (Curtis)*
- Dendrocerus laticeps* (Hedicke)*
- Dendrocerus liebscheri* Dessart*
- Dendrocerus rectangularis* (Kieffer)*

PTEROMALIDAE

ASAPHINAE

- Asaphes vulgaris* Walker*

PTEROMALIDAE

PTEROMALINAE

- Pachyneuron aphidis* (Bouché)
- Pachyneuron muscarum* (L.)*

EULOPHIDAE

TETRASTICHINAE

- Aprostocetus ?clavicornis* (Zetterstedt)*

Table 2 Checklist of aphid species found parasitised in Wales

APHIDINAE		<i>Staegeriella necopinata</i> (Börner)
<i>Anuraphis farfarae</i> (Koch)		<i>Subsaltusaphis picta</i> (Hille Ris Lambers)
<i>Aphis alienus</i> Theobald		<i>Uroleucon jaceae</i> (L.)
<i>Aphis crepidis</i> (Börner)		<i>Uroleucon tanacetii</i> (L.)
<i>Aphis fabae</i> ssp. <i>cirsiiacanthoidis</i> Scopoli		
<i>Aphis farinosa</i> Gmelin		CALAPHIDINAE
<i>Aphis loti</i> Kaltenbach		<i>Betulaphis quadrituberculata</i> Kaltenbach
<i>Aphis nasturtii</i> Kaltenbach		<i>Eucallipterus tiliae</i> (L.)
<i>Aphis ruborum</i> (Börner)		<i>Euceraphis betulae</i> Koch
<i>Aphis sedi</i> Kaltenbach		<i>Monaphis antennata</i> (Kaltenbach)
<i>Brachycaudus cardui</i> (L.)		<i>Myzocallis carpini</i> Koch
<i>Brachycaudus klugkisti</i> (Börner)		<i>Myzocallis coryli</i> (Goetze)
<i>Capitophorus hippophaes</i> (Walker)		<i>Myzocallis schreiberi</i> Hille Ris Lambers
<i>Cavariella aegopodii</i> (Scopoli)		& Stroyan
<i>Cavariella theobaldi</i> (Gillette & Bragg)		<i>Pterocallis alni</i> (De Geer)
<i>Corylobium avellanae</i> (Schrank)		<i>Pterocallis maculata</i> (von Heyden)
<i>Elatobium abietinum</i> (Walker)		<i>Tuberculatus annulatus</i> (Hartig)
<i>Hyalopterus pruni</i> (Geoffroy)		
<i>Hyperomyzus picridis</i> (Börner & Blunck)		CHAITOPHORINAE
<i>Illinoia liriodendri</i> (Monell)		<i>Chaitophorus capreae</i> (Mosley)
<i>Liosomaphis berberidis</i> (Kaltenbach)		<i>Chaitophorus leucomelas</i> Koch
<i>Macrosiphoniella artemisiae</i> Boyer		<i>Periphyllus hirticornis</i> (Walker)
de Fonscolombe		<i>Periphyllus lyropictus</i> (Kessler)
<i>Macrosiphum rosae</i> (L.)		<i>Periphyllus testudinaceus</i> (Ferne)
<i>Microlophium carnosum</i> (Buckton)		
<i>Myzaphis bucktoni</i> Jacob		DREPANOSIPHINAE
<i>Myzaphis rosarum</i> (Kaltenbach)		<i>Drepanosiphum platanoidis</i> (Schrank)
<i>Myzus cerasi</i> (F.)		
<i>Myzus ligustri</i> (Mosley)		ERIOSOMATINAE
<i>Myzus lythri</i> (Schrank)		<i>Eriosoma lanigerum</i> (Hausmann)
<i>Nasonovia ribisnigri</i> (Mosley)		
<i>Pterocomma dubium</i> Börner		LACHNINAE
<i>Pterocomma konoii</i> Hori		<i>Cinara brauni</i> Börner
<i>Pterocomma populeum</i> (Kaltenbach)		<i>Cinara pinea</i> (Mordvilko)
<i>Rhopalosiphum nymphaeae</i> (L.)		<i>Cinara schimitscheki</i> Börner
<i>Rhopalosiphum padi</i> (L.)		<i>Eulachnus brevipilosus</i> Börner
<i>Schizaphis rufula</i> (Walker)		<i>Eulachnus rileyi</i> (Williams)
		<i>Schizolachnus obscurus</i> Börner

tenuicaudus. These discoveries demonstrate how rewarding the study of less popular groups of insects can be.

Although Ferrer-Suay *et al.* (2012) list the hyperparasitoid *Phaenoglyphis longicornis* (Hartig) from England and Scotland, on the basis of old literature records, Van Veen (2009) does not include this species in his Checklist and its reported association with *Periphyllus lyropictus* (Kessler) has not been recorded previously. A number of *Alloxysta* species reared from known aphid hosts in Wales remain unidentified, and it is likely that many new species will be added to the British fauna in the coming years as the complex taxonomy of the Charipinae is elucidated.

Trophic associations of aphid parasitoids and host aphids that to the author’s knowledge have not been reported before in the literature are listed in Table 3.

Parasitoids targeting the invasive aphid *Illinoia liriodendri* (Monell) are listed in Appendix 1. The main host for this aphid is *Liriodendron tulipifera*, a North American tree frequently planted in urban areas in Britain. By late summer, *I. liriodendri* has been observed by the author in huge numbers on *L. tulipifera* in Wales, with colonies

Table 3 – New trophic associations of aphid parasitoids

P	A	PP	H	PHP
<i>Acer campestre</i>	<i>Periphyllus</i> sp.	<i>Aphidius setiger</i> *	<i>Alloxysta</i> sp.	
<i>Acer platanoides</i>	<i>Periphyllus lyropictus</i>	<i>Aphidius setiger</i> / <i>Trioxys falcatus</i> *	<i>Phaenoglyphis</i> sp.	
<i>Acer platanoides</i>	<i>Periphyllus lyropictus</i>	<i>Aphidius setiger</i> / <i>Trioxys falcatus</i> *	<i>Phaenoglyphis longicornis</i> #	
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Aphidius funebris</i> / <i>Praon yomenae</i> *	<i>Alloxysta leunisii</i>	
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Aphidius funebris</i> / <i>Praon yomenae</i> *	<i>Alloxysta cursor</i> / <i>pedestris</i>	
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Aphidius funebris</i> / <i>Praon yomenae</i> *		<i>Pachyneuron aphidis</i>
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Aphidius funebris</i> / <i>Praon yomenae</i> *	<i>Phaenoglyphis salicis</i>	
<i>Heracleum sphondylium</i>	<i>Cavariella theobaldi</i>	<i>Binodoxys heraclei</i> *	<i>Alloxysta piceomaculata</i> #	
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Aphelinus abdominalis</i>		
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Praon volucre</i>		
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Aphelinus</i> sp.*	<i>Alloxysta</i> sp.	
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Aphelinus</i> sp/ <i>Praon volucre</i> *	<i>Aprostocetus</i> <i>?clavicornis</i>	<i>Aprostocetus</i> <i>?clavicornis</i>
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Aphelinus</i> sp.*	<i>Syrphophagus</i> sp.	<i>Syrphophagus</i> sp.
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Praon volucre</i> *		<i>Asaphes</i> sp.
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Praon volucre</i> *		<i>Dendrocerus carpenteri</i> <i>Dendrocerus laticeps</i>
<i>Nymphaea alba</i>	<i>Rhopalosiphum nymphaeae</i>	<i>Ephedrus plagiator</i> *		
<i>Nymphaea alba</i>	<i>Rhopalosiphum nymphaeae</i>	<i>Praon necans</i> *	<i>Alloxysta</i> sp.	
<i>Nymphaea alba</i>	<i>Rhopalosiphum nymphaeae</i>	<i>Praon necans</i> *	<i>Phaenoglyphis villosa</i>	
<i>Pastinaca sativa</i>	<i>Cavariella theobaldi</i>	<i>Praon cavariellae</i>		
<i>Pastinaca sativa</i>	<i>Cavariella theobaldi</i>	<i>Binodoxys</i> sp.*	<i>Alloxysta arcuata</i>	
<i>Pastinaca sativa</i>	<i>Cavariella theobaldi</i>	<i>Binodoxys</i> sp.*	<i>Phaenoglyphis salicis</i>	
<i>Picris echioides</i>	<i>Hyperomyzus picridis</i>	<i>Ephedrus</i> sp.*	<i>Phaenoglyphis villosa</i>	
<i>Populus alba</i>	<i>Pterocomma dubium</i>	<i>Aphidius cingulatus</i>		
<i>Quercus robur</i>	<i>Tuberculatus annulatus</i>	<i>Aphelinus subflavescens</i> *	<i>Syrphophagus</i> sp.	<i>Syrphophagus</i> sp.
<i>Quercus robur</i>	<i>Tuberculatus annulatus</i>	<i>Trioxys pallidus</i> *	<i>Syrphophagus taeniatus</i>	<i>Syrphophagus taeniatus</i>
<i>Rosa pimpinellifolia</i>	<i>Myzaphis bucktoni</i> & <i>M. rosarum</i> (mixed colonies)	<i>Ephedrus laevicollis</i> *	<i>Alloxysta</i> sp.	
<i>Salix caprea</i>	<i>Chaitophorus capreae</i>	<i>Adialytus salicaphis</i> *	<i>Alloxysta</i> sp.	
<i>Salix</i> sp.	<i>Aphis farinosa</i>	<i>Lysiphlebus confusus</i> *	<i>Alloxysta arcuata</i>	
<i>Salix</i> sp.	<i>Aphis farinosa</i>	<i>Lysiphlebus conufusus</i> *	<i>Phaenoglyphis salicis</i>	
<i>Salix</i> sp.	<i>Aphis farinosa</i>	<i>Lysiphlebus confusus</i> *	<i>Syrphophagus</i> sp.	<i>Syrphophagus</i> sp.
<i>Salix</i> sp.	<i>Chaitophorus</i> sp.	<i>Adialytus salicaphis</i> *	<i>Phaenoglyphis villosa</i>	
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Praon flavinode</i> / <i>Trioxys pallidus</i> *	<i>Syrphophagus mamitus</i>	<i>Syrphophagus mamitus</i>
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Praon flavinode</i> / <i>Trioxys pallidus</i> *	<i>Syrphophagus taeniatus</i>	<i>Syrphophagus taeniatus</i>

P = host plant; A = aphid; PP = primary parasitoid; H = hyperparasitoid; PHP = pseudohyperparasitoid;
* = record based on mummy characteristics; # = record based on ovipositing adult.

covering large portions of leaf undersides and sometimes upper-sides. Honeydew production is extensive leading to sooty mould colonisation and attracting social wasps (Vespidae: Vespinae) and flies. Aphid feeding causes leaves to curl and develop necrotic patches. The only primary parasitoids found targeting *I. liriodendri* are the polyphagous *Aphelinus abdominalis* and *Praon volucre*. *Aphelinus abdominalis* targets early instars, so aphid mummification occurs before the adult stage, whereas *P. volucre* targets later instars, so mummification occurs at the adult stage. Only scattered mummies have been observed amongst colonies, so it seems these polyphagous parasitoids are not capable of exerting any significant control over *I. liriodendri*.

The majority of records in Appendix 1 arise from urban parks, amenity landscaping and 'brown-field' land and demonstrate that such habitats can harbour a significant diversity of aphids and their parasitoids. Communities associated with aphids feeding on agricultural crops have not been studied, though there is a significant body of European literature covering these habitats, including examples from Britain such as Powell (1982). Most semi-natural habitats in Wales are unexplored in terms of their aphid and aphid parasitoid faunas, but may harbour interesting species and associations. The European fauna of aphid parasitoids has been most intensively studied in Central and Eastern Europe, so a detailed understanding of the fauna in Wales, on the western fringe of Europe, could contribute to a better understanding of the fauna as a whole.

The author would welcome records of aphid parasitoids from Wales, or elsewhere in Britain, particularly where the host association is known. The development of similar catalogues and Checklists for England, Scotland and Ireland is encouraged, and should feed into a general catalogue and Checklist for Britain and Ireland.

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Appendix 1. Catalogue of trophic associations of aphid parasitoids based on records from Wales. Host plants are listed alphabetically by plant genus. *Syrphophagus* and *Aprostocetus* are listed under hyperparasitoid and pseudohyperparasitoid categories since the former may operate as both and the mode of parasitism of the latter is not known.

Key
P = host plant; A = aphid; PP = primary parasitoid; H = hyperparasitoid; PHP = pseudohyperparasitoid; LDCR = location, date, collector (if known), references (if appropriate)
* = record based on mummy characteristics; # = record based on ovipositing adult; CV = cultivar

P	A	PP	H	PHP	LDCR
<i>Acer campestre</i>	<i>Periphyllus hirticornis</i>	<i>Aphidius setiger</i>			The Wharf, Schooner Way, Cardiff Bay. 10/2012. E. A. Baker
<i>Acer campestre</i>	<i>Periphyllus hirticornis</i>	<i>Aphidius setiger</i> *		<i>Asaphes vulgaris</i>	The Wharf, Schooner Way, Cardiff Bay. 10/2012. E. A. Baker
<i>Acer campestre</i>	<i>Periphyllus hirticornis</i>	<i>Aphidius setiger</i> *		<i>Dendrocercus carpenteri</i>	The Wharf, Schooner Way, Cardiff Bay. 10/2012. E. A. Baker
<i>Acer campestre</i>	<i>Periphyllus</i> sp.	<i>Aphidius setiger</i>			Schooner Way, Cardiff Bay. 09/2007. E. A. Baker Baker & Broad (2009)
<i>Acer campestre</i>	<i>Periphyllus</i> sp.	<i>Aphidius setiger</i> *	<i>Alloxysta</i> sp.		Schooner Way, Cardiff Bay. 09/2007. E. A. Baker Baker & Broad (2009)
<i>Acer campestre</i>	<i>Periphyllus</i> sp.	<i>Aphidius setiger</i> *		<i>Asaphes vulgaris</i>	Schooner Way, Cardiff Bay. 09/2007. E. A. Baker Baker & Broad (2009)
<i>Acer campestre</i>	<i>Periphyllus testudinaceus</i>	<i>Areopraon silvestre</i>			Roxby Court, Cardiff Bay. Collected 05/2011 reared 09/2011. E. A. Baker Baker & Broad (in prep.) Broad <i>et al.</i> (2012)
<i>Acer campestre</i>	<i>Periphyllus testudinaceus</i>	<i>Trioxyx falcatus</i>			The Wharf, Schooner Way, Cardiff Bay. 04/2011. E. A. Baker
<i>Acer campestre</i>	<i>Periphyllus testudinaceus</i>	<i>Trioxyx falcatus</i> *		<i>Asaphes vulgaris</i> #	Schooner Way, Cardiff Bay. 06/2012. E. A. Baker
<i>Acer platanoides</i> CV	<i>Periphyllus lyropictus</i>	<i>Aphidius setiger</i> #			Lloyd George Avenue, Cardiff Bay. 04/2011. E. A. Baker
<i>Acer platanoides</i> CV	<i>Periphyllus lyropictus</i>	<i>Aphidius setiger</i>			Lloyd George Avenue, Cardiff Bay. 10/2012. E. A. Baker
<i>Acer platanoides</i> CV	<i>Periphyllus lyropictus</i>	<i>Aphidius setiger</i> *		<i>Asaphes vulgaris</i>	Lloyd George Avenue, Cardiff Bay. 10/2012. E. A. Baker
<i>Acer platanoides</i> CV	<i>Periphyllus lyropictus</i>	<i>Aphidius setiger</i> *		<i>Dendrocercus carpenteri</i>	Lloyd George Avenue, Cardiff Bay. 10/2012. E. A. Baker
<i>Acer platanoides</i> CV	<i>Periphyllus</i> sp.	<i>Trioxyx falcatus</i>			Lloyd George Avenue, Cardiff Bay. 06/2009. E. A. Baker Baker & Broad (2009) Broad <i>et al.</i> (2012)

(continued)

Appendix 1. (continued)

P	A	PP	H	PHP	LDCR
<i>Acer platanoides</i> CV	<i>Periphyllus testudinaceus</i>	<i>Trioxys falcatus</i>			Lloyd George Avenue, Cardiff Bay. 04/2011. E. A. Baker
<i>Acer platanoides</i>	<i>Periphyllus lyropictus</i>	<i>Aphidius setiger</i>			Severn Avenue, Barry. 10/2012. E. A. Baker
<i>Acer platanoides</i>	<i>Periphyllus lyropictus</i>	<i>Aphidius setiger</i> *		<i>Asaphes vulgaris</i>	North Road, Cardiff. 06/2013. E. A. Baker
<i>Acer platanoides</i>	<i>Periphyllus lyropictus</i>	<i>Aphidius setiger</i> *		<i>Dendrocerus carpenteri</i>	Severn Avenue, Barry. 10/2012. E. A. Baker
<i>Acer platanoides</i>	<i>Periphyllus lyropictus</i>	<i>Trioxys falcatus</i> #			Severn Avenue, Barry. 04/2011. E. A. Baker
<i>Acer platanoides</i>	<i>Periphyllus lyropictus</i>	<i>Aphidius setiger</i> / <i>Trioxys falcatus</i> *	<i>Phaenoglyphis</i> sp.#		Lloyd George Avenue, Cardiff Bay 05/2011. E. A. Baker
<i>Acer platanoides</i>	<i>Periphyllus lyropictus</i>	<i>Aphidius setiger</i> / <i>Trioxys falcatus</i> *	<i>Phaenoglyphis longicornis</i> #		Severn Avenue, Barry 05/2010. E. A. Baker
<i>Acer platanoides</i>	<i>Periphyllus</i> sp.	<i>Trioxys falcatus</i> *		<i>Asaphes</i> sp.	Severn Avenue, Barry. 05/2011. E. A. Baker
<i>Acer platanoides</i>	<i>Periphyllus testudinaceus</i>	<i>Trioxys falcatus</i> *		<i>Asaphes</i> sp.	Severn Avenue, Barry. 04/2011. E. A. Baker
<i>Acer pseudoplatanus</i>	<i>Drepanosiphum platanoidis</i>	<i>Aphelinus thomsoni</i>			Merthyr Mawr NNR. 06/2011. Romilly Park, Barry. 06/2011. E. A. Baker
<i>Acer pseudoplatanus</i>	<i>Drepanosiphum platanoidis</i>	<i>Dyscritulus planiceps</i> *			County Hall, Cardiff Bay. 2007–2012 Romilly Park, Barry. 2007–2012. E. A. Baker
<i>Acer pseudoplatanus</i>	<i>Drepanosiphum platanoidis</i>	<i>Falciconus pseudoplatani</i>			County Hall, Cardiff Bay. 05/2011. Merthyr Mawr NNR. 05/2011. E. A. Baker
<i>Acer pseudoplatanus</i>	<i>Drepanosiphum platanoidis</i>	<i>Trioxys cirsii</i>			County Hall, Cardiff Bay. 05/2011. Merthyr Mawr NNR.
<i>Acer saccharinum</i>	<i>Periphyllus</i> sp.	<i>Trioxys falcatus</i>			05/2011. E. A. Baker Romilly Park, Barry. 06/2009. E. A. Baker Baker & Broad (2009) Broad <i>et al.</i> (2012)
<i>Alnus glutinosa</i>	<i>Pterocallis alni</i>	<i>Trioxys</i> sp.*	<i>Alloxysta citripes</i>		Merthyr Mawr NNR. 06/2011. E. A. Baker
<i>Alnus glutinosa</i>	<i>Pterocallis maculata</i>	<i>Aphelinus subflavescens</i>			Schooner Way, Cardiff Bay. 05/2011. E. A. Baker
<i>Alnus glutinosa</i>	<i>Pterocallis maculata</i>	<i>Trioxys pallidus</i>			Schooner Way, Cardiff Bay. 05/2011. E. A. Baker
<i>Ammophila arenaria</i>	<i>Schizaphis rufula</i>	<i>Praon volucre</i>			Merthyr Mawr NNR. 06/2009. E. A. Baker
<i>Artemisia vulgaris</i>	<i>Macrosiphoniella artemisiae</i>	<i>Aphidius asteris</i>			The Knap, Barry. 07/2009. E. A. Baker
<i>Betula pendula</i>	<i>Betulaphis quadrituberculata</i>	<i>Aphidius aquilus</i>			Salisbury Road, Barry. 06/2009 Schooner Way, Cardiff Bay. 06/2009 Merthyr Mawr NNR. 06/2013. E. A. Baker

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Appendix 1. (continued)

P	A	PP	H	PHP	LDCR
<i>Betula pendula</i>	<i>Betulaphis quadrituberculata</i>	<i>Praon flavinode</i>			Merthyr Mawr NNR. 06/2013. E. A. Baker
<i>Betula pendula</i>	<i>Betulaphis quadrituberculata</i>	<i>Aphelinus subflavescens</i>			Cathays Park, Cardiff. 06/2013. E. A. Baker
<i>Betula pendula</i>	<i>Euceraphis betulae</i>	<i>Aphelinus subflavescens</i>			Romilly Park, Barry. 09/2012. Bute Park, Cardiff. 06/2013
<i>Betula pendula</i>	<i>Euceraphis betulae</i>	<i>Aphidius aquilus</i>			E. A. Baker Romilly Park, Barry. 09/2012. E. A. Baker
<i>Betula pendula</i>	<i>Euceraphis betulae</i>	<i>Aphidius aquilus*</i>		<i>Dendrocerus carpenteri</i>	Romilly Park, Barry. 09/2012/ Merthyr Mawr NNR. 06/2013. E. A. Baker.
<i>Betula pendula</i>	<i>Euceraphis betulae</i>	<i>Betuloxys compressicornis</i>			Romilly Park, Barry. 09/2012. Bute Park, Cardiff. 06/2013. Merthyr Mawr NNR. 06/2013. E. A. Baker
<i>Betula pendula</i>	<i>Euceraphis betulae</i>	<i>Praon flavinode</i>			Romilly Park, Barry. 09/2012. E. A. Baker
<i>Betula pendula</i>	<i>Euceraphis betulae</i>	<i>Praon flavinode*</i>		 <i>Dendrocerus carpenteri</i>	Merthyr Mawr NNR. 06/2013. E. A. Baker
<i>Betula pendula</i>	<i>Euceraphis betulae</i>	<i>Trixys betulae</i>			Bute Park, Cardiff. 06/2013. E. A. Baker
<i>Betula utilis</i> CV	<i>Monaphis antennata</i>	<i>Aphelinus subflavescens</i>			Red Dragon Centre, Cardiff Bay. 08/2010. E. A. Baker. Baker (2010). Noyes (2012)
<i>Buddleja davidii</i>	<i>Myzus</i> sp.	<i>Aphidius matricariae</i>			Atlantic Wharf, Cardiff Bay. 06/2011. E. A. Baker
<i>Carex riparia</i>	<i>Subsaltusaphis picta</i>	<i>Praon spinosum</i>			Cosmeston Park, Penarth. 04/2009. E. A. Baker
<i>Carpinus betulus</i> CV	<i>Myzocallis carpini</i>	<i>Aphelinus subflavescens</i>			Baker & Broad (2009) Broad <i>et al.</i> (2012) Britannia Quay, Cardiff Bay. 06/2011. E. A. Baker
<i>Carpinus betulus</i> CV	<i>Myzocallis carpini</i>	<i>Trixys pallidus</i>			Britannia Quay, Cardiff Bay. 06/2011. Schooner Way, Cardiff Bay. 06/2011. E. A. Baker
<i>Carpinus betulus</i> CV	<i>Myzocallis carpini</i>	<i>Trixys pallidus*</i>	<i>Alloxysta citripes</i>		Schooner Way, Cardiff Bay. 06/2011. E. A. Baker
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Aphidius funebris</i>			Cardiff Bay Wetlands Reserve. 06/2009. E. A. Baker
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Praon yomenae</i>			Cardiff Bay Wetlands Reserve. 06/2009 & 06/2011. E. A. Baker
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Aphidius funebris/ Praon yomenae*</i>	<i>Alloxysta leunisii</i>		Baker & Broad (in prep.) Cardiff Bay Wetlands Reserve. 06/2009. E. A. Baker

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Appendix 1. (continued)

P	A	PP	H	PHP	LDCR
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Aphidius funebris</i> / <i>Praon yomenae</i> *	<i>Alloxysta</i> <i>cursor</i> / <i>pedestris</i>		Cardiff Bay Wetlands Reserve. 08/2009 E. A. Baker
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Aphidius funebris</i> / <i>Praon yomenae</i> *	<i>Phaenoglyphis</i> <i>salicis</i>		Cardiff Bay Wetlands Reserve. 06/2011. E. A. Baker
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Aphidius funebris</i> / <i>Praon yomenae</i> *		<i>Asaphes</i> sp.	Cardiff Bay Wetlands Reserve. 09/2009. E. A. Baker
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Aphidius funebris</i> / <i>Praon yomenae</i> *		<i>Dendrocerus</i> <i>carpenteri</i>	Cardiff Bay Wetlands Reserve. 08/2009. E. A. Baker
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Aphidius funebris</i> / <i>Praon yomenae</i> *		<i>Dendrocerus</i> sp.	Cardiff Bay Wetlands Reserve. 08/2009. E. A. Baker
<i>Centaurea nigra</i>	<i>Uroleucon jaceae</i>	<i>Aphidius funebris</i> / <i>Praon yomenae</i> *		<i>Pachyneuron</i> <i>aphidis</i>	Cardiff Bay Wetlands Reserve. 08/2009. E. A. Baker
<i>Cirsium arvense</i>	<i>Aphis fabae</i> ssp. <i>cirsiiacanthoidis</i>	<i>Lysiphlebus fabarum</i>			Cardiff Bay Wetlands Reserve. 07/2009. E. A. Baker
<i>Corylus avellana</i>	<i>Corylobium</i> <i>avellanae</i>	<i>Ephedrus plagiator</i>			Halliard Court, Cardiff Bay. 05/2011. E. A. Baker
<i>Corylus avellana</i>	<i>Corylobium</i> <i>avellanae</i>	<i>Praon dorsale</i>			Halliard Court, Cardiff Bay. 05/2011. E. A. Baker
<i>Corylus avellana</i>	<i>Corylobium</i> <i>avellanae</i>	<i>Ephedrus plagiator</i> *		<i>Asaphes</i> <i>vulgaris</i>	Halliard Court, Cardiff Bay. 05/2011. E. A. Baker
<i>Corylus avellana</i>	<i>Corylobium</i> <i>avellanae</i>	<i>Ephedrus plagiator</i> *		<i>Dendrocerus</i> <i>carpenteri</i>	Halliard Court, Cardiff Bay. 05/2011. E. A. Baker
<i>Corylus avellana</i>	<i>Myzocallis coryli</i>	<i>Aphelinus subflavescens</i>			Porthkerry Park, Barry. 06/2011. E. A. Baker
<i>Corylus avellana</i>	<i>Myzocallis coryli</i>	<i>Trioxyys pallidus</i>			Porthkerry Park, Barry. 06/2011. E. A. Baker
<i>Crepis</i> sp.	<i>Aphis crepidis</i>	<i>Lysiphlebus fabarum</i>			Cardiff Bay Wetlands Reserve. 06/2011. E. A. Baker
<i>Crepis</i> sp.	<i>Hyperomyzus</i> <i>picridis</i>	<i>Aphidius sonchi</i>			Barry train station. 07/2013. E. A. Baker
<i>Dactylis glomerata</i>	<i>Sitobion</i> sp.	<i>Aphidius avenae</i> *			Bron Awelon, Barry. 07/2013. E. A. Baker
<i>Dactylis glomerata</i>	<i>Sitobion</i> sp.	<i>Aphidius ervi</i> *			Bron Awelon, Barry. 07/2013. E. A. Baker
<i>Dactylis glomerata</i>	<i>Sitobion</i> sp.	<i>Aphidius</i> sp./ <i>Ephedrus</i> sp.		<i>Dendrocerus</i> <i>carpenteri</i>	Bron Awelon, Barry. 07/2013. E. A. Baker
<i>Dipsacus fullonum</i>	<i>Macrosiphum</i> <i>rosae</i>	<i>Aphidius rosae</i>			Brown-field land, Schooner Way, Cardiff Bay. 06/2011. E. A. Baker
<i>Galium verum</i>	<i>Staegeriella</i> <i>necopinata</i>	<i>Binodoxys brevicornis</i>			Porthkerry Park, Barry. 06/2011. E. A. Baker
					Baker & Broad (in prep.)

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Appendix 1. (continued)

P	A	PP	H	PHP	LDCR
<i>Heracleum sphondylium</i>	<i>Cavariella theobaldi</i>	<i>Binodoxys heraclei</i>			Porthkerry Park, Barry. 06/2011. E. A. Baker
<i>Heracleum sphondylium</i>	<i>Cavariella theobaldi</i>	<i>Binodoxys heraclei</i> *	<i>Alloxysta piceomaculata</i> #		Porthkerry Park, Barry. 06/2011. E. A. Baker
<i>Hippophae rhamnoides</i>	<i>Capitophorus hippophaes</i>	<i>Diaeretiella rapae</i>			Merthyr Mawr NNR. 05/2011. E. A. Baker
<i>Hippophae rhamnoides</i>	<i>Capitophorus hippophaes</i>	<i>Diaeretiella rapae</i> *		<i>Dendrocerus carpenteri</i>	Merthyr Mawr NNR. 05/2011. E. A. Baker
<i>Lapsana communis</i>	<i>Nasonovia ribisnigri</i>	<i>Aphelinus asychis</i>			Bron Awelon, Barry. 07/2011. E. A. Baker
<i>Lapsana communis</i>	<i>Nasonovia ribisnigri</i>	<i>Monoctonus crepidis</i>			Bron Awelon, Barry. 06/2011. E. A. Baker
<i>Ligustrum ovaifolium</i>	<i>Myzus ligustri</i>	<i>Monoctonus ligustri</i>			Bron Awelon, Barry. 06/2011. E. A. Baker
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Aphelinus abdominalis</i>			Lloyd George Avenue, Cardiff Bay. 08/2012. E. A. Baker
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Aphelinus</i> sp.			Roath Park, Cardiff. 08/2009. Romilly Park, Barry. 08/2009 & 07/2011 E. A. Baker
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Aphelinus</i> sp.*	<i>Alloxysta</i> sp.		Roath Park, Cardiff. 08/2009. E. A. Baker
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Aphelinus</i> sp.*	<i>Syrpho-phagus</i> sp.	<i>Syrpho-phagus</i> sp.	Romilly Park, Barry. 07/2011. E. A. Baker
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Praon volucre</i>			Romilly Park, Barry. 07/2011. Lloyd George Avenue, Cardiff Bay. 08/2008 & 08/2012 E. A. Baker
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Praon volucre</i> *		<i>Asaphes</i> sp.	Romilly Park, Barry. 07/2011. E. A. Baker
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Praon volucre</i> *		<i>Dendrocerus carpenteri</i>	Romilly Park, Barry. 07/2011. E. A. Baker
<i>Liriodendron tulipifera</i>	<i>Illinoia liriodendri</i>	<i>Aphelinus</i> sp./ <i>Praon volucre</i> *	<i>Aprostocetus</i> ? <i>clavicornis</i>	<i>Aprostocetus</i> ? <i>clavicornis</i>	Roath Park, Cardiff. Romilly Park, Barry. E. A. Baker
<i>Lotus corniculatus</i>	<i>Aphis loti</i>	<i>Lysiphlebus fabarum</i>			Cold Knap Point, Barry. 07/2011. E. A. Baker
<i>Lythrum salicaria</i>	<i>Myzus lythri</i>	<i>Aphidius matricariae</i>			Cardiff Bay Wetlands Reserve. 07/2009. E. A. Baker
<i>Mahonia aquifolium</i>	<i>Liosomaphis berberidis</i>	<i>Aphidius hortensis</i>			Schooner Way, Cardiff Bay. 06/2009. E. A. Baker
<i>Malus</i> sp.	<i>Eriosoma lanigerum</i>	<i>Aphelinus mali</i>			Ogwen Drive, Cyncoed, Cardiff. 08/2009. E. Baker
<i>Nymphaea alba</i>	<i>Rhopalosiphum nymphaeae</i>	<i>Ephedrus plagiator</i>			Canal between Haxby & Kirkby Court, Cardiff Bay. 08/2011. E. A. Baker
					Baker & Broad (in prep.)

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Appendix 1. (continued)

P	A	PP	H	PHP	LDCR
<i>Nymphaea alba</i>	<i>Rhopalosiphum nymphaeae</i>	<i>Ephedrus plagiator*</i>		<i>Dendrocerus laticeps</i>	Canal between Haxby & Kirkby Court, Cardiff Bay. 08/2011. E. A. Baker Baker & Broad (in prep.)
<i>Nymphaea alba</i>	<i>Rhopalosiphum nymphaeae</i>	<i>Praon necans</i>			Canal between Haxby & Kirkby Court, Cardiff Bay. 08/2011. E. A. Baker Baker & Broad (in prep.)
<i>Nymphaea alba</i>	<i>Rhopalosiphum nymphaeae</i>	<i>Praon necans*</i>	<i>Alloxysta</i> sp.		Broad <i>et al.</i> (2012) Canal between Haxby & Kirkby Court, Cardiff Bay. 08/2011. E. A. Baker Baker & Broad (in prep.)
<i>Nymphaea alba</i>	<i>Rhopalosiphum nymphaeae</i>	<i>Praon necans*</i>	<i>Phaenoglyphis villosa</i>		Canal between Haxby & Kirkby Court, Cardiff Bay. 08/2011. E. A. Baker Baker & Broad (in prep.)
<i>Nymphaea alba</i>	<i>Rhopalosiphum nymphaeae</i>	<i>Praon necans*</i>		<i>Asaphes</i> sp.	Canal between Haxby & Kirkby Court, Cardiff Bay. 08/2011. E. A. Baker Baker & Broad (in prep.)
<i>Pastinaca sativa</i>	<i>Cavariella theobaldi</i>	<i>Binodoxys angelicae</i>			Schooner Way, Cardiff Bay. 08/2012. E. A. Baker
<i>Pastinaca sativa</i>	<i>Cavariella theobaldi</i>	<i>Praon cavariellae</i> #			Schooner Way, Cardiff Bay. 08/2012. E. A. Baker Baker & Broad (in prep.)
<i>Pastinaca sativa</i>	<i>Cavariella theobaldi</i>	<i>Praon cavariellae</i>			Schooner Way, Cardiff Bay. 08/2012. E. A. Baker Baker & Broad (in prep.)
<i>Pastinaca sativa</i>	<i>Cavariella theobaldi</i>	<i>Binodoxys</i> sp.*	<i>Alloxysta arcuata</i>		Schooner Way, Cardiff Bay. 08/2012. E. A. Baker
<i>Pastinaca sativa</i>	<i>Cavariella theobaldi</i>	<i>Binodoxys</i> sp.*	<i>Phaenoglyphis salicis</i>		Schooner Way, Cardiff Bay. 08/2012. E. A. Baker
<i>Pastinaca sativa</i>	<i>Cavariella theobaldi</i>	<i>Binodoxys</i> sp.*		<i>Dendrocerus carpenteri</i>	Schooner Way, Cardiff Bay. 08/2012. E. A. Baker
<i>Phragmites australis</i>	<i>Hyalopterus pruni</i>	<i>Aphelinus</i> ? <i>flaviventris</i>			Cardiff Bay Wetlands Reserve. 09/2009. E. A. Baker
<i>Phragmites australis</i>	<i>Hyalopterus pruni</i>	<i>Aphelinus</i> sp.*		<i>Asaphes</i> sp.	Cardiff Bay Wetlands Reserve. 09/2009. E. A. Baker

(continued)

Appendix 1. (continued)

P	A	PP	H	PHP	LDCR
<i>Phragmites australis</i>	<i>Hyalopterus pruni</i>	<i>Praon volucre</i>			Cardiff Bay Wetlands Reserve. 06/2009 & 09/2012 E. A. Baker
<i>Phragmites australis</i>	<i>Hyalopterus pruni</i>	<i>Praon volucre</i> *		<i>Dendrocerus carpenteri</i>	Cardiff Bay Wetlands Reserve. 09/2012. E. A. Baker
<i>Picea pungens</i> var. <i>glauca</i>	<i>Elatobium abietinum</i>	<i>Lysaphidus schimitscheki</i> *		<i>Asaphes</i> sp.	Porthkerry Park, Barry. 06/2011. E. A. Baker
<i>Picea pungens</i> var. <i>glauca</i>	<i>Elatobium abietinum</i>	<i>Lysaphidus schimitscheki</i> *		<i>Asaphes vulgaris</i>	Porthkerry Park, Barry. 06/2011. E. A. Baker
<i>Picris echioides</i>	<i>Hyperomyzus picridis</i>	<i>Ephedrus</i> sp*	<i>Phaenoglyphis villosa</i>		Barry train station. 10/2012. E. A. Baker
<i>Picris echioides</i>	<i>Hyperomyzus picridis</i>	<i>Ephedrus</i> sp.*		<i>Asaphes vulgaris</i>	Barry train station. Collected 08/2012 reared 10/2012 E. A. Baker
<i>Pinus nigra</i>	<i>Cinara brauni</i>	<i>Pauesia laricis</i>			Red Dragon Centre, Cardiff Bay. 2007. E. A. Baker Baker (2009) Broad <i>et al.</i> (2012)
<i>Pinus nigra</i>	<i>Cinara brauni</i>	<i>Pauesia picta</i>			Red Dragon Centre, Cardiff Bay 09/2009. E. A. Baker Broad <i>et al.</i> (2012)
<i>Pinus nigra</i>	<i>Cinara schimitscheki</i>	<i>Pauesia laricis</i>			Red Dragon Centre, Cardiff Bay. 10/2007& 08/2009 E. A. Baker Baker (2009) Broad <i>et al.</i> (2012)
<i>Pinus nigra</i>	<i>Cinara schimitscheki</i>	<i>Pauesia</i> sp.*			Red Dragon Centre, Cardiff Bay. 08/2012. E. A. Baker
<i>Pinus nigra</i>	<i>Cinara schimitscheki</i>	<i>Pauesia</i> sp.*		<i>Asaphes vulgaris</i>	Red Dragon Centre, Cardiff Bay. 08/2012. E. A. Baker
<i>Pinus nigra</i>	<i>Eulachnus rileyi</i>	<i>Praon bicolor</i>			Red Dragon Centre, Cardiff Bay & Romilly Park, Barry. 10/2009. E. A. Baker Baker & Broad (2009) Broad <i>et al.</i> (2012)
<i>Pinus nigra</i>	<i>Schizolachnus obscurus</i>	<i>Pauesia unilachni</i>			Red Dragon Centre, Cardiff Bay. 08/2009. E. A. Baker (Baker 2009) Broad <i>et al.</i> (2012)
<i>Pinus sylvestris</i>	<i>Cinara pinea</i>	<i>Pauesia laricis</i>			Romilly Park, Barry. 08/2009. E. A. Baker Broad <i>et al.</i> (2012)
<i>Pinus sylvestris</i>	<i>Cinara pinea</i>	<i>Pauesia pini</i>			Merthyr Mawr NNR. 06/2009. E. A. Baker Broad <i>et al.</i> (2012)

(continued)

Appendix 1. (continued)

P	A	PP	H	PHP	LDCR
<i>Pinus sylvestris</i>	<i>Cinara pinea</i>	<i>Pauesia</i> sp.*		<i>Asaphes vulgaris</i>	Merthyr Mawr NNR. 06/2011. E. A. Baker
<i>Pinus sylvestris</i>	<i>Eulachmus brevipilosus</i>	<i>Diaeretus leucopterus</i>			Merthyr Mawr NNR. 06/2011. E. A. Baker
<i>Pinus sylvestris</i>	<i>Cinara pinea</i>			<i>Dendrocerus liebscheri</i>	Coed Y Wenallt, Cardiff 16/06/1978. M. Jervis Fergusson (1980) Broad (2011)
<i>Pinus sylvestris</i>	<i>Cinara pinea</i>			<i>Dendrocerus liebscheri</i>	Cardiff 07/1977. N. A. C. Kidd
<i>Pinus sylvestris</i>	<i>Cinara pinea</i>			<i>Dendrocerus liebscheri</i>	Cardiff 1977. N. A. C. Kidd
<i>Populus alba</i>	<i>Pterocomma dubium</i>	<i>Aphidius cingulatus</i>			County Hall, Cardiff Bay. 04/2010. E. A. Baker
<i>Populus alba</i>	<i>Pterocomma populeum</i>	<i>Aphidius cingulatus</i> *			Longeil Close, Cardiff Bay 08/2012. E. A. Baker
<i>Populus</i> sp.	<i>Chaitophorus leucomelas</i>	<i>Adialytus salicaphis</i>			The Wharf, Schooner Way, Cardiff Bay. 06/2008. E. A. Baker
<i>Populus</i> sp.	<i>Pterocomma populeum</i>	<i>Aphidius cingulatus</i> *			Baker & Broad (2009) Broad <i>et al.</i> (2012) The Wharf, Schooner Way, Cardiff Bay
<i>Prunus padus</i>	<i>Rhopalosiphum padi</i>	<i>Monoctonus caricis</i>			Since 2007. E. A. Baker
<i>Prunus</i> sp.	<i>Hyalopterus pruni</i>	<i>Praon volucre</i>			Schooner Way, Cardiff Bay. 04/2011. E. A. Baker
<i>Prunus</i> sp.	<i>Hyalopterus pruni</i>	<i>Praon volucre</i> *	<i>Alloxysta castanea</i>		County Hall, Cardiff Bay. 07/2011 & 08/2012
<i>Prunus</i> sp.	<i>Hyalopterus pruni</i>	<i>Praon volucre</i> *		<i>Dendrocerus carpenteri</i>	E. A. Baker County Hall, Cardiff Bay. 07/2011. E. A. Baker
<i>Quercus ilex</i>	<i>Myzocallis schreiberi</i>	<i>Trioxys</i> sp.*			County Hall, Cardiff Bay. 08/2012. E. .A. Baker
<i>Quercus robur</i>	<i>Tuberculatus annulatus</i>	<i>Aphelinus subflavescens</i>			Romilly Park, Barry. Since 2007. E. A. Baker
<i>Quercus robur</i>	<i>Tuberculatus annulatus</i>	<i>Aphelinus subflavescens</i> *	<i>Alloxysta citripes</i>		Baker (2007) Merthyr Mawr NNR. 06/2011. Roath Park, Cardiff.
<i>Quercus robur</i>	<i>Tuberculatus annulatus</i>	<i>Aphelinus subflavescens</i> *	<i>Syrpho-phagus</i> sp.	<i>Syrphophagus</i> sp.	06/2011. E. A. Baker Roath Park, Cardiff. 06/2011. E. A. Baker
<i>Quercus robur</i>	<i>Tuberculatus annulatus</i>	<i>Trioxys pallidus</i>			Merthyr Mawr NNR. 06/2011. E. A. Baker
					Atlantic Wharf, Cardiff Bay. 04/2011. Romilly Park, Barry. 07–10/2012. E. A. Baker

(continued)

Appendix 1. (continued)

P	A	PP	H	PHP	LDCR
<i>Quercus robur</i>	<i>Tuberculatus annulatus</i>	<i>Trioxys pallidus</i> *	<i>Syrphophagus taeniatus</i>	<i>Syrphophagus taeniatus</i>	Romilly Park, Barry. 09/2012. E. A. Baker
<i>Ranunculus lingua</i>	<i>Aphis nasturtii</i>	<i>Ephedrus plagiator</i>			Cardiff Bay Wetlands Reserve. 07/2009. E. A. Baker
<i>Ranunculus lingua</i>	<i>Aphis nasturtii</i>	<i>Lysiphlebus fabarum</i>			Cardiff Bay Wetlands Reserve. 07/2009. E. A. Baker
<i>Rosa pimpinellifolia</i>	<i>Myzaphis bucktoni</i> & <i>M. rosarum</i> (mixed colonies)	<i>Ephedrus laevicollis</i>			Merthyr Mawr NNR. 05/2011. E. A. Baker
<i>Rosa pimpinellifolia</i>	<i>Myzaphis bucktoni</i> & <i>M. rosarum</i> (mixed colonies)	<i>Ephedrus laevicollis</i> *	<i>Alloxysta</i> sp.		Baker & Broad (in prep.)
<i>Rubia peregrina</i>	<i>Myzus cerasi</i>	<i>Aphidius matricariae</i>			Merthyr Mawr NNR. 05/2011. E. A. Baker
<i>Rubus fruticosus</i>	<i>Aphis ruborum</i>	<i>Lysiphlebus fabarum</i>			Baker & Broad (in prep.)
<i>Rubus fruticosus</i>	<i>Aphis ruborum</i>	<i>Lysiphlebus fabarum</i> *		<i>Dendrocerus carpenteri</i>	The Knap, Barry. 05/2009. E. A. Baker
<i>Salix caprea</i>	<i>Aphis farinosa</i>	<i>Lysiphlebus confusus</i>			Hardy Court, Cardiff Bay. 08/2012. E. A. Baker
					Hardy Court, Cardiff Bay. 08/2012. E. A. Baker
					Cardiff Bay Wetlands Reserve. 06/2009/2010/2011
					Schooner Way, Cardiff Bay. 06/2009–2011
					E. A. Baker
<i>Salix caprea</i>	<i>Aphis farinosa</i>	<i>Lysiphlebus confusus</i> *		<i>Asaphes</i> sp.	Broad <i>et al.</i> (2012)
<i>Salix caprea</i>	<i>Aphis farinosa</i>	<i>Lysiphlebus confusus</i> *		<i>Dendrocerus carpenteri</i>	Schooner Way, Cardiff Bay. 06/2011. E. A. Baker
<i>Salix caprea</i>	<i>Aphis farinosa</i>	<i>Lysiphlebus confusus</i> *		Pteromalidae	Schooner Way, Cardiff Bay. 06/2011. E. A. Baker
<i>Salix caprea</i>	<i>Chaitophorus capreae</i>	<i>Adialytus salicaphis</i>			Schooner Way, Cardiff Bay. 06/2011. E. A. Baker
					09/2007. E. A. Baker
<i>Salix caprea</i>	<i>Chaitophorus capreae</i>	<i>Adialytus salicaphis</i> *	<i>Alloxysta</i> sp.		Baker & Broad (2009)
<i>Salix caprea</i>	<i>Pterocomma konoï</i>	<i>Aphidius cingulatus</i>			Broad <i>et al.</i> (2012)
<i>Salix caprea</i>	<i>Pterocomma konoï</i>	<i>Aphidius cingulatus</i> *		<i>Dendrocerus carpenteri</i>	The Wharf, Cardiff Bay. 09/2007. E. A. Baker
<i>Salix caprea</i>	<i>Pterocomma</i> sp.	<i>Aphidius cingulatus</i> *		<i>Dendrocerus carpenteri</i>	Baker & Broad (2009)
					Merthyr Mawr NNR. 06/2011. E. A. Baker
					Merthyr Mawr NNR. 06/2011. E. A. Baker
					Taff trail, Bute Park, Cardiff. 06/2013. E. A. Baker

(continued)

Appendix 1. (continued)

P	A	PP	H	PHP	LDCR
<i>Salix cinerea</i>	<i>Cavariella aegopodii</i>	<i>Aphidius salicis</i>			Dinefwr Park, Carmarthenshire. 06/2013. E. A. Baker
<i>Salix cinerea</i>	<i>Cavariella aegopodii</i>	<i>Aphidius salicis</i> *		<i>Dendrocerus carpenteri</i>	Dinefwr Park, Carmarthenshire. 06/2013. E. A. Baker
<i>Salix cinerea</i>	<i>Chaitophorus capreae</i>	<i>Aphelinus fulvus</i>			Barquentine Place, Schooner Way, Cardiff Bay. 06/2011. E. A. Baker
<i>Salix</i> sp.	<i>Aphis farinosa</i>	<i>Lysiphlebus confusus</i>			Schooner Way, Cardiff Bay. 06/2011. E. A. Baker
<i>Salix</i> sp.	<i>Aphis farinosa</i>	<i>Lysiphlebus confusus</i> *	<i>Alloxysta arcuata</i>		Schooner Way, Cardiff Bay. 05 & 06/2011 E. A. Baker
<i>Salix</i> sp.	<i>Aphis farinosa</i>	<i>Lysiphlebus confusus</i> *	<i>Phaenoglyphis salicis</i>		Schooner Way, Cardiff Bay. 05/2011. E. A. Baker
<i>Salix</i> sp.	<i>Aphis farinosa</i>	<i>Lysiphlebus confusus</i> *	<i>Syrphophagus</i> sp.	<i>Syrphophagus</i> sp.	Schooner Way, Cardiff Bay. 05/2011. E. A. Baker
<i>Salix</i> sp.	<i>Aphis farinosa</i>	<i>Lysiphlebus confusus</i> *		<i>Asaphes</i> sp.	Schooner Way, Cardiff Bay. 05/2011. E. A. Baker
<i>Salix</i> sp.	<i>Cavariella theobaldi</i>	<i>Binodoxys brevicornis</i>			County Hall, Cardiff Bay. 05/2011. E. A. Baker
<i>Salix</i> sp.	<i>Cavariella theobaldi</i>	<i>Binodoxys heraclei</i>			Baker & Broad (in prep.) County Hall, Cardiff Bay. 05/2011. E. A. Baker
<i>Salix</i> sp.	<i>Chaitophorus</i> sp.	<i>Adialytus salicaphis</i>			Canal opposite Celerity Drive, Cardiff Bay. 06/2011. E. A. Baker
<i>Salix</i> sp.	<i>Chaitophorus</i> sp.	<i>Adialytus salicaphis</i> *	<i>Phaenoglyphis villosa</i>		Canal opposite Celerity Drive, Cardiff Bay. 08/2011. E. A. Baker
<i>Sedum anglicum</i>	<i>Aphis sedi</i>	<i>Lysiphlebus fabarum</i>			The Knap, Barry. 06/2009. E. A. Baker
<i>Senecio vulgaris</i>	<i>Brachycaudus cardui</i>	<i>Lysiphlebus fabarum</i>			Brown-field land, Schooner Way, Cardiff Bay. 07/2009. E. A. Baker
<i>Silene vulgaris</i>	<i>Brachycaudus klugkisti</i>	<i>Aphidius matricariae</i>			Barry Island. 06/2009. E. A. Baker
<i>Tanacetum vulgare</i>	<i>Uroleucon tanaceti</i>	<i>Praon yomenae</i>			Duffryn Gardens, Vale of Glamorgan. 07/2013. E. A. Baker
<i>Teucrium scorodonia</i>	<i>Aphis alienus</i>	<i>Adialytus ambiguus</i>			The Knap, Barry 06/2009. E. A. Baker
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Aphelinus subflavescens</i>			Lloyd George Avenue, Cardiff Bay. 10/2012. E. A. Baker

(continued)

Appendix 1. (continued)

P	A	PP	H	PHP	LDCR
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Praon flavinode</i>			Lloyd George Avenue, Cardiff Bay. 10/2012. Romilly Park, Barry. 07/2012. E. A. Baker
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Trioxys curvicaudus</i>			Bute Park, Cardiff. 06/2013. E. A. Baker
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Trioxys pallidus</i>			Lloyd George Avenue, Cardiff Bay. 10/2012 Bute Park, Cardiff. 06/2013. E. A. Baker
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Trioxys tenuicaudus</i>			Bute Park, Cardiff. 06/2013. E. A. Baker
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Trioxys pallidus*</i>	<i>Alloxysta citripes</i>		Lloyd George Avenue, Cardiff Bay. 10/2012. E. A. Baker
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Trioxys pallidus*</i>		<i>Asaphes vulgaris</i>	Lloyd George Avenue, Cardiff Bay. 10/2012. E. A. Baker
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Trioxys pallidus*</i>		<i>Dendrocerus aphidum</i>	Lloyd George Avenue, Cardiff Bay. 10/2012. E. A. Baker
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Trioxys pallidus*</i>		<i>Dendrocerus carpenteri</i>	Lloyd George Avenue, Cardiff Bay. 10/2012. E. A. Baker
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Trioxys sp.*</i>		<i>Asaphes vulgaris</i>	Bute Park, Cardiff. 06/2013. E. A. Baker
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Praon flavinode/ Trioxys pallidus*</i>	<i>Syrphophagus mamitus</i>	<i>Syrphophagus mamitus</i>	Lloyd George Avenue, Cardiff Bay. 10/2012. E. A. Baker
<i>Tilia platyphyllos</i>	<i>Eucallipterus tiliae</i>	<i>Praon flavinode/ Trioxys pallidus*</i>	<i>Syrphophagus taeniatus</i>	<i>Syrphophagus taeniatus</i>	Lloyd George Avenue, Cardiff Bay. 10/2012. E. A. Baker
<i>Tilia sp.</i>	<i>Eucallipterus tiliae</i>	<i>Praon flavinode</i>			Romilly Park, Barry. 07/2010/2011 E. A. Baker
<i>Tilia sp.</i>	<i>Eucallipterus tiliae</i>	<i>Trioxys sp.*</i>	<i>Alloxysta citripes</i>		Romilly Park, Barry. 07/2011. E. A. Baker
<i>Tilia sp.</i>	<i>Eucallipterus tiliae</i>	<i>Trioxys sp.*</i>	<i>Syrphophagus sp.</i>	<i>Syrphophagus sp.</i>	Romilly Park, Barry. 08/2011. E. A. Baker
<i>Tussilago farfara</i>	<i>Anuraphis farfarae</i>	<i>Paralipsis enervis*</i>			Brown-field land, Schooner Way, Cardiff Bay. 07/2007. E. A. Baker
<i>Urtica dioica</i>	<i>Microlophium carnosum</i>	<i>Aphidius microlophii</i>			Birchgrove woods, Barry. 06/2009. E. A. Baker

Appendix 2. List of aphid parasitoids recorded from Wales without host or hostplant data.

Family/ Subfamily	Species	Location	Date	Collector	Reference
Aphelininae	<i>Aphelinus abdominalis</i>	Bardsey Island, Pembrokeshire		R. R. Askew	Askew (1974)
	<i>Aphelinus annulipes</i>				Askew (1967)
	<i>Aphelinus asychis</i>	Bardsey Island, Pembrokeshire		R. R. Askew	Askew (1974)
Aphidiinae	<i>Paralipsis enervis</i>				Broad <i>et al.</i> (2012)
	<i>Praon longicorne</i>	Govilon, Monmouthshire		T. A. Marshall	Mackauer (1961) Broad <i>et al.</i> (2012)
Asaphinae	<i>Asaphes vulgaris</i>	Ynys Enlli SH12 Caernarvonshire	08/1968–08/1971	R. R. Askew	Askew (1974) Noyes (2012)
Charipinae	<i>Alloxysta brachyptera</i>	North of Tremadoc, Caernarvonshire	15/09/1977	Z. Bouèek	Van Veen (2009)
	<i>Alloxysta brachyptera</i>	Gwynedd			Fergusson (1986)
	<i>Alloxysta pedestris</i>	Llandonna, Anglesey	17/06/1962	V. F. Eastop	Van Veen (2009)
	<i>Alloxysta pedestris</i>	Llethrid, Gower, Glamorgan	01/08/1975	J. S. Noyes	Van Veen (2009)
	<i>Apocharips xanthocephala</i> = <i>A. trapezoidea</i>	Dyfed			Ferguson (1986) Van Veen (2009)
Encyrtinae	<i>Syrphophagus mamitus</i>				Japoshvili (2007) Noyes (2012)
Megaspilidae	<i>Dendrocerus aphidum</i>	Llanddona, Anglesey	17/06/1962	V. F. Eastop	Broad (2011)
	<i>Dendrocerus aphidum</i>	Swansea, Glamorgan	01/08/1975	J. S. Noyes	Broad (2011)
	<i>Dendrocerus aphidum</i>	Kenfig Pool, Glamorgan	02/08/1975	J. S. Noyes	Broad (2011)
	<i>Dendrocerus aphidum</i>	Merthyr Mawr, Glamorgan	26/05/1975	J. S. Noyes	Broad (2011)
	<i>Dendrocerus carpenteri</i>	Newton, Monmouthshire ST 2378	28/05/1966	M. C. Day	Broad (2011)
	<i>Dendrocerus dubiosus</i> = <i>D. rectangularis</i>	Newton, Monmouthshire ST 2378	28/06/1966	M. C. Day	Broad (2011)
	<i>Dendrocerus dubiosus</i> = <i>D. rectangularis</i>	Kenfig Pool, Glamorgan	02/08/1975	J. S. Noyes	Broad (2011)
Pteromalinae	<i>Pachyneuron concolor</i> = <i>P. muscarum</i>	Ynys Enlli	08/1969–08/1971	R. R. Askew	Askew (1974) Noyes (2012)

European Congress of Entomology 2014

The Royal Entomological Society will host the ECE at the University of York on 3–8th August 2014. If you would like to register your interest in this meeting please email your details to Kirsty Whiteford kirsty@royensoc.co.uk.
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For more details of parallel programme sessions contact the ECE2014 programme co-ordinator, Dr Klaus Reinhardt, Klaus@royensoc.co.uk. Programme and booking information can be found on the RES ECE dedicated website.

SHORT COMMUNICATIONS

Two mealybug species on *Alchemilla mollis*, including the second British record of marsh mealybug *Atrococcus paludinus* (Green) (Hemiptera: Pseudococcidae). – Fifteen, live adult female mealybugs were collected from the stems and foliage of *Alchemilla mollis* (Buser) Rothm. (Rosaceae) growing in the rock garden at the Royal Horticultural Society's Garden, Wisley, Surrey (VC17, TQ0658), on 20 September 2012, by the second author, and submitted to The Food and Environment Research Agency (FERA), where they were identified as *Atrococcus paludinus* (Green), the marsh mealybug (Kosztarab & Kozár, 1988). The mealybugs were elongate-oval, dark brownish-purple, with a light dusting of greyish wax, and up to 3.6mm long (this is longer than 2.4mm reported by Kosztarab & Kozár (1988)) (Fig. 1). A repeat sample of plant material was collected from the same location on the 8 November 2012 and found to contain dead post-reproductive adult females with white waxy ovisacs harbouring cream to pale-yellow eggs, which supports the hypothesis that the mealybug overwinters in the immature stage.

This is only the second confirmed record of this mealybug in Britain (Williams, 1962), after a gap of 92 years. The first record of *A. paludinus* in Britain was from Wicken Fen, Cambridgeshire (VC29, TL5627), in September 1920. It is from those specimens that this species was first described by Green (1921), as *Pseudococcus paludinus*. Green's specimens were collected from the lower surface of foliage of various herbaceous plants, including *Convolvulus* sp. (Convolvulaceae), *Eupatorium cannabinum* L. (Asteraceae), *Lysimachia* sp. (Primulaceae), *Symphytum officinale* L. (Boraginaceae), and *Urtica* sp. (Urticaceae). Green also recorded *Spiraea* sp. (Rosaceae) as a host, however; *Spiraea* is now accepted as a genus of ornamental garden plants, and it is probable that this record should refer to *Filipendula* sp., e.g., meadowsweet. *Atrococcus paludinus* was subsequently described under the names *Pseudococcus impeditus*



Fig 1 *Atrococcus paludinus* adult female mealybugs preserved in alcohol, showing the characteristic dark brownish-purple colour. Scale bar = 1mm.

Borchsenius and *P. alfredii* Rasina (Danzig, 1978, 1980). *Atrococcus paludinus* may be identified using the keys by Williams (1962) and Kosztarab & Kozár (1988). A record of *A. paludinus* by Green (1934) is referable to *A. cracens* Williams (Williams, 1962).

Atrococcus paludinus is a trans-Palaeartic species that is known to occur from the Mediterranean in the south to Scandinavia in the north, and from Portugal in the west to Russia's Sakhalin region in the east. It also occurs on the Kuril Islands (Russian) in the Pacific. It is broadly polyphagous, feeding mainly on herbaceous plants, and has been recorded on 19 plant families. It exhibits a preference for plants in the Asteraceae and Rosaceae, and is most commonly found on *Rubus* in mainland Europe (Ben-Dov, 2012). It has been recorded feeding on tomato plants in a commercial glasshouse in Ille-et-Vilaine, France (Matile-Ferrero & Germain, 2002), and has the potential to damage other cultivated plants, as its hosts include the economically important genera: *Humulus* (Cannabaceae); *Lactuca* (Asteraceae); *Ribes* (Grossulariaceae); *Rosa* (Rosaceae); and *Medicago* and *Trifolium* (Fabaceae).

The fact that *A. paludinus* has only been recorded twice in Britain is likely to be a reflection of under-recording, rather than an indication of its true status. Many of its host plants, such as *Rubus* spp. (Rosaceae) and *Urtica dioica* L., are very common throughout Britain and it may occur widely but has been overlooked, as the insect is small, cryptic and usually feeds on the undersides of the foliage or at the base of stems (Kosztarab & Kozár, 1988).

Also observed on the roots and lower stems of the same *A. mollis* plants collected on the 8 November 2012 were adult female mealybugs, nymphs, and egg sacs of *Rhizoecus albidus* Goux (Hemiptera: Rhizoecidae), commonly known as white root-mealybug. The adult female mealybugs were elongate-oval, white, and up to 1.5mm long (Fig. 2).

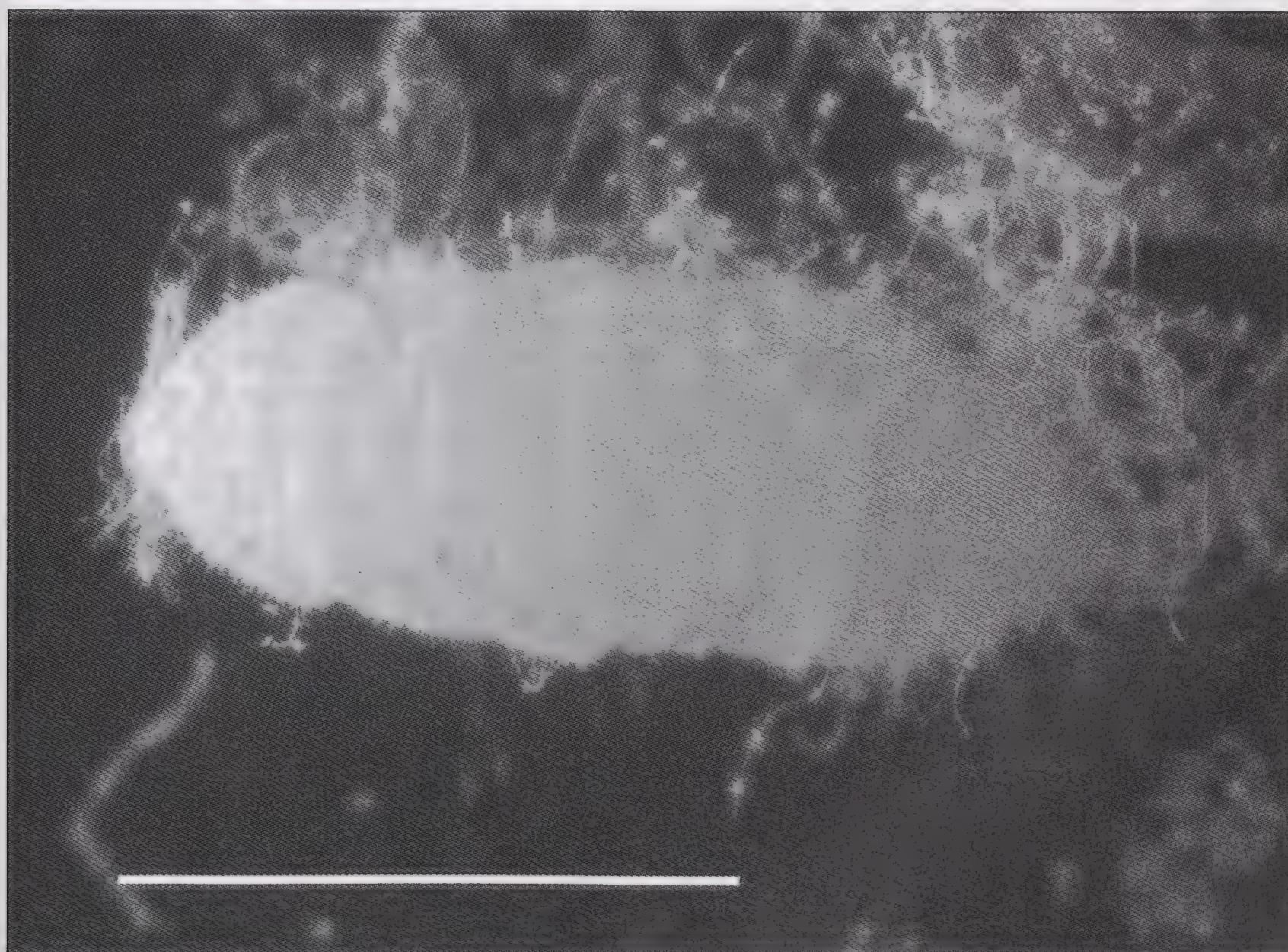


Fig 2 *Rhizoecus albidus* adult mealybug, beginning to produce an ovisac of loose wax filaments. Scale bar = 1mm.

Rhizoecus albidus is usually entirely subterranean and this appears to be the first observation of *R. albidus* feeding on the lower stems and ovipositing among the lower dead leaf whorls, which was probably due to the plants being partially waterlogged after a prolonged wet period.

Rhizoecus albidus was originally described from specimens collected from the roots of *Festuca* sp. (Poaceae) in Besseney, France, by Goux (1942), and subsequently described under the names *R. uniporus* Borchsenius & Tereznikova and *R. gentianae* Panis (Kozár & Konczné Benedicty, 2007). *Rhizoecus albidus* may be identified using the keys by Williams (1962), Kosztarab & Kozár (1988), and Kozár & Konczné Benedicty (2007). It is a trans-Palaeartic species with a similar distribution to *A. paludinus*, although there are fewer records due to its subterranean nature. It is rarely recorded in Britain, but has been found in Vice Counties 17, 20, 36, 39, 40 and 67 (Williams, 1962). The first author recently collected it at Robin Hood's Bay, North Yorkshire (VC62, NZ9504), on the roots of grasses (Poaceae), mosses (Bryophyta), and *Sedum* sp. (Crassulaceae), 20.vi.2010, and at Calton Hill, Edinburgh, Mid Lothian (VC83, NT2674), on the roots of grasses and mosses, 17.ix.2011 (first record from Scotland). It is most frequently found on the roots of grasses and is an occasional pest on the continent. It has also been recorded on the roots of plants belonging to Asteraceae, Crassulaceae, Cyperaceae, Ericaceae, Gentianaceae and Plumbaginaceae (Kozár & Konczné Benedicty, 2007).

Alchemilla mollis is a new host for *A. paludinus* and *R. albidus*, and no other mealybug species have been recorded on this plant in Britain.— CHRISTOPHER MALUMPHY, The Food and Environment Research Agency, Sand Hutton, York, YO41 1LZ, & ANDREW HALSTEAD, The Royal Horticultural Society's Garden, Wisley, Woking, Surrey GU23 6QB.

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***Xylota segnis* (L.) (Diptera: Syrphidae) found feeding on human remains.** – As part of a police investigation, a forensic anthropologist at the University of Central Lancashire was sent some human bones to analyse and comment upon. They had been recovered from mixed woodland dominated by sessile oak *Quercus petraea* (Mattuschka) Liebl., south west of Coventry, after being discovered, partly buried, by a passing dog-walker in 2012. The bones transpired to be from a man who had been murdered some three years previously, and were in a state close to skeletalisation but still with small areas of soft tissue. Being buried in the woodland soil had kept the bones relatively moist.

Despite the bones having been cleaned of most soil before several weeks of refrigeration, and having been packaged and posted, a number of dipteran larvae were found feeding upon the remaining soft tissue. There were around 20 *Piophilidae* (L.) (Diptera: Piophilidae) and around ten *Xylota segnis* (L.) (Diptera: Syrphidae). *Piophilidae*, the cheese-skipper, is a cosmopolitan species commonly found on animal remains in a state of decomposition beyond ‘active decay’ (Byrd & Castner, 2001) but short of skeletalisation. *Xylota segnis* has not been recorded feeding upon human remains previously, but is normally associated with decaying tree sap, including wet situations (Rotheray, 1993). Buried in earth at the base of a tree which had been blown over, the bones were perhaps an extension of habitat already occupied by the species, with the wet decaying soft tissue presenting a suitable alternative food for the *Xylota* larvae. Rearing to adulthood failed for all larvae as they died in various stages of pupation, perhaps as they had spent a considerable time in refrigeration.

Most British non-aphidophagous syrphids feed on decomposing plant tissue (Stubbs & Falk, 1983; Rotheray & Gilbert, 2011) although the genus *Eristalis* Latreille may occur on carrion that is sufficiently wet. This taxon was included in Megnin’s list of insects in the faunal succession of a carcass (Megnin, 1894). It has been proposed that it was adults of the drone fly, *E. tenax* (L.), rather than a honey bee, which was seen emerging from a lion’s carcass in the biblical story, giving rise to the phrase ‘out of the strong came forth sweetness’ (Smith, 1986). This is consistent with an ancient belief that bees could be created from a ‘recipe’; spontaneously emerging from putrefying carcasses (Marshall, 2012).

The author is very grateful to Graham Rotheray (National Museums of Scotland, Edinburgh) for his interest and identification of a specimen, and to colleagues Tal Simmons for the opportunity to look at the insects and Malcolm Edmunds for casting an eye over the manuscript. – COLIN MOFFATT, University of Central Lancashire, Preston, Lancashire. cmoffatt@uclan.ac.uk

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***Phytocoris pini* Kirschbaum (Hemiptera-Heteroptera: Miridae) in Surrey (VC17).** – On 14 August 2013, I sampled amenity plantings in Cathedral Hill Industrial Estate, Guildford (SU9850), where on black pine *Pinus nigra*, I beat three unfamiliar small pale *Phytocoris* females. These were later determined as *P. pini*, a new species for Surrey and the first for south-east England. The origin of these bugs is unknown but the same trees supported the recently introduced jumping spider *Macaroeris nidicolens* (Walckenaer), which in Surrey is otherwise also known from black pines at Brooklands (Denton, 2004), where several new species to Britain have been found, including no less than four beetles, including the weevil *Brachyderes incanus* (L.) which is a damaging pest species of black pine in Europe (Denton, 2012). Clearly quarantining has been lax in such circumstances and it seems plausible that the bugs may have been imported along with the trees. – JONTY DENTON, 31 Thorn Lane, Four Marks, Hants GU34 5BX.

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The aura of a cabinet. – I enjoyed Richard Jones's article on the provenance of cabinets (BJENH 26: 149–155). I am in his camp on this. Knowing something of a cabinet's history adds greatly to my own enjoyment in using it.

Some years ago I was left a cabinet by my childhood mentor, Major General Lipscomb; courageous soldier and butterfly variety hunter, sometimes at the same time. It was a standard, 20-drawer Watkins and Doncaster in deal. It served me well and I valued it highly. But eventually, after no little soul-searching, I traded it in for a superior version. I don't know whether its provenance has survived the exchange of hands or if it is now 'just a cabinet', shorn of any historical or emotional significance. Perhaps I should have written its history on the back.

Another cabinet, which I still have, had a strip of paper lying loose in one drawer with the typed words 'Exhibited by Baron de Worms'. The Baron was a larger-than-life personality, famed for his extraordinary eating habits. Dining once at the home of his friend Robert Craske, he devoured a heroic amount of food at world-class speed, and promptly brought it all up again on the dining table. He was never invited back, on Mrs. Craske's orders. I can't see that cabinet without thinking of de Worms.

Finally, I recently acquired a beautiful Crockett cabinet in mahogany and was delighted to find a fading label on the back showing that it was once supplied by Janson, the dealer, to Professor Poulton of Oxford University.

However it is not Poulton's ground-breaking work on the species concept that I think of whenever I look at the cabinet, nor his seminal investigations into animal colours. Instead, one of the great images of entomology comes to mind. It is a description, penned by former student J. D. Gillett, of the great man blowing his nose. 'A certain obstacle in the shape of an enormous moustache stood in the way of easy operation. The performance started with a more or less almighty blow and was quickly followed by what can best be described as a ritualistic wiping of his nose and moustache and pretty well all his face, first one side, then the other and back again. The whole performance was executed deftly and at enormous speed, like some giant dipteran grooming its antennae'.

The Poulton provenance adds no value to the cabinet, in terms of pounds and pence. Nor, unfortunately, does its aura ward off the dreaded *Anthrenus*. But the pleasure it brings to my entomological life is immense. – RUPERT BARRINGTON, Damson House, Church Lane, Freshford, Bath, Somerset BA2 7WD.

***Nysius graminicola* (Kolenati) (Hemiptera: Lygaeidae) in West Sussex (VC13).** – This little grey-brown groundbug was first found in Britain in 1977 in Dorset (Allen, 1984). However, there have been few other published records since. Kirby (1992) mentions no further sightings of the animal, and categorised it as RDB3; but Richard Dickson found the insect in South Hampshire in 2001, and John Widgery recorded it in Hertfordshire in 2003 (Nau, 2004; Widgery, 2004; Dickson, 2005 & 2007). I first found the bug myself in 2006 at three sites in Oxfordshire (Ryan, 2013), in which county I have not seen the insect again.

However, on 1 August 2010, I encountered the animal once more, whilst visiting Thorney Island, on the West Sussex coast. Here I noticed, whilst walking along the top of the sea wall, a particularly bushy specimen of a composite (Asteraceae) (possibly *Tripleurospermum maritimum* (L.) W. D. J. Koch), growing out of the bottom of the wall, close to the water-line (SU764046). Although seemingly out of reach, the plant was too tempting a target, on what had hitherto been a disappointing day in the field. So, clutching my unfurled sweep net in one hand and my beating stick in the other (and without first undertaking a formal risk assessment), I leant over the wall and at full stretch managed to strike the plant several times over the open net; and recover the net, stick and myself to the sea wall top. My endeavour was rewarded by fourteen specimens of *Nysius* Dallas, two of which proved to be *N. graminicola* (one male and one female), the remainder being *N. ericae* (Schilling) (five males and seven females). Ten days later, I encountered *N. graminicola* again in West Sussex, this time 5.6 km across the water at East Head, near West Wittering (SZ768990). Sweeping the dunes here, I took a single specimen of the bug (a male), together with seventeen *N. ericae* (one male and sixteen females).

It is perplexing as to why records of this bug have so seldom reached print, in comparison with its similar and widely reported congener *N. senecionis* (Schilling), which was first found in Britain as recently as 1992 (Hodge & Porter, 1997). Misidentification is unlikely, as there are several clear characters separating these two species, and the pair are clearly distinct from the other British *Nysius* (Hodge & Porter, 1997; Dolling, 2003; Dickson 2007). Maybe, *N. graminicola* is, as it appears, uncommon in Britain. – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: RobRyanBugs@yahoo.co.uk).

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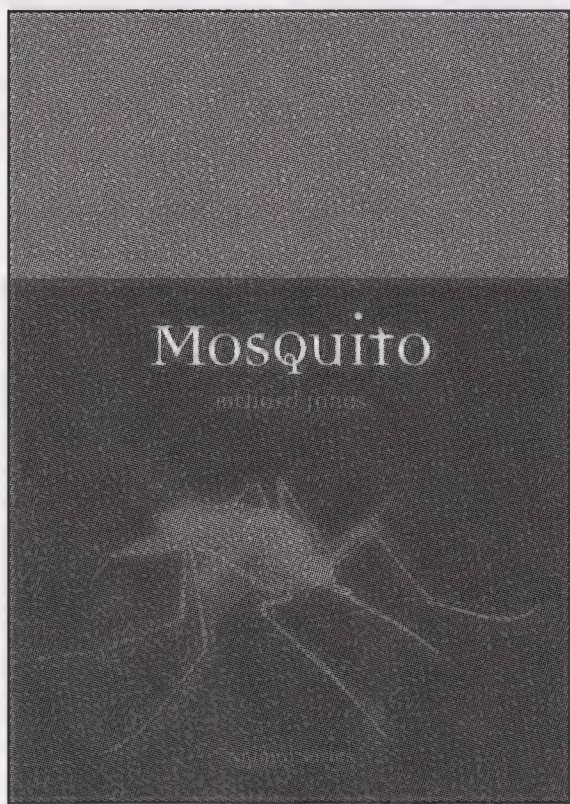
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***Psallus albicinctus* (Kirschbaum) (Hemiptera: Miridae) new to North Wiltshire (VC 7).** – This small, oak-dwelling bug is categorised as Notable B by Kirby (1992). I have taken the insect in my home county of Oxfordshire at two sites: a singleton sweeping a woodland clearing at Kingwood Common, Stoke Row in the Chiltern Hills (Grid Reference SU696827, 11 June 2010); and seven examples beating a solitary oak tree at a field corner in New Marston Meadows, Oxford (SP518080, 5 June 2011 and 6 June 2012). My most recent capture was on 20 June 2012, when I took a single specimen sweeping a ride in Savernake Forest, Wiltshire (SU212673). There is already a record of this bug for Watsonian Oxfordshire (Campbell, 2008), but a search of the national entomological literature has revealed that my Savernake Forest specimen is a new vice-county record for North Wiltshire. – R. P. RYAN, 38 St John Street, Oxford, OX1 2LH (email: *RobRyanBugs@yahoo.co.uk*).

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BOOK REVIEWS



Mosquitoes by Richard Jones. (Reaktion Books, London). Hardback, 216 pp, 94 illustrations, 61 in colour. Price £9.99. ISBN 978-1-86189-923-1

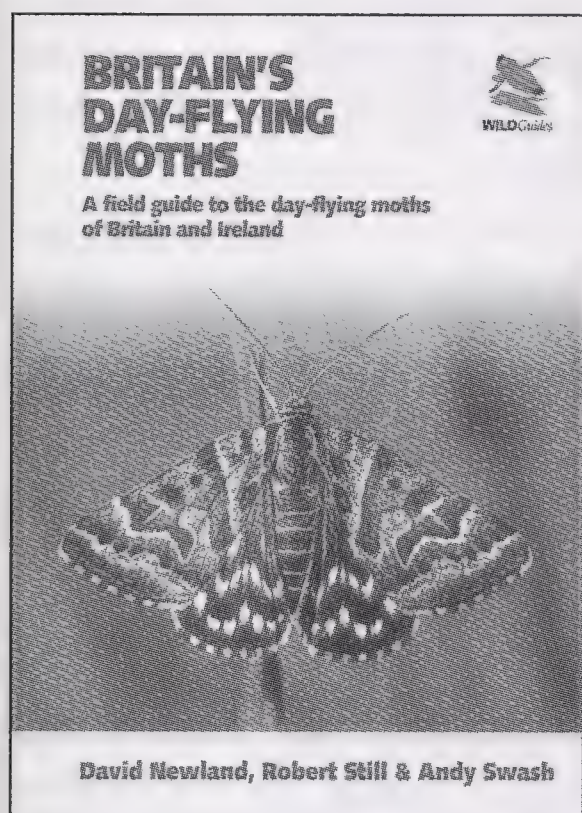
It seems appropriate to be writing this review for 'Mosquito' by Richard Jones on world mosquito day. On this day in 1897, the link between the malarial plasmodium and mosquitoes was first published. Our understanding moved into a new scientific era, away from misunderstandings of these creatures and the diseases they spread – "malaria" was a derivation of "bad air" – there was even one for water (mal'agua). This book is a potted history of the mosquito and its relationship with humans. No group of animals seems to cause as much nuisance to people, and this is detailed here, from laments in early literature through to essays on the mosquito's effect on military manoeuvres, agriculture and on human migration.

Jones does not bog us down with terminology and very loosely covers the taxonomic arrangement. Sadly this is the one part of the book that was incorrect as they have not been arranged as three subfamilies for a while now (as stated in the book) but instead just two, the Anophelines and the Culicines (the Toxorhynchitini are now placed here). However, putting this aside this is an incredibly informative book in a very similar vein to the others in this series (the *Fly* by Steven Connor is another). He has an easy writing style, often resulting in me guffawing due to some of the obscure facts that he sourced for us. For example, the Mayans thought that mosquitoes were spies, removing the secrets from their victims while they were draining them of blood! Little facts like that entertain throughout the book.

As well as the written component there are many illustrations throughout taken from various books, leaflets, public health posters and so on. These are very diverse in their style but the reader is more often than not left with the opinion that the

mosquito is indeed a dastardly creature. The overuse of chemicals and the impact this has on the rest of the ecosystem is also discussed, with that chapter finishing on a worrying thought that although we seem to be understanding more about mosquitoes and the role they play, the actual information getting across to the public is diminishing. This is a theme raised often within the field and it is good to have this expressed here in a readily accessible book. Overall a very enjoyable read to introduce people to the incredibly diverse but important world of the mosquito.

ERICA McALISTER



Britain's Day-Flying Moths – A Field Guide to the Day-Flying Moths of Britain and Ireland by David Newland, Robert Still & Andy Swash, produced in association with Butterfly Conservation, published by Princeton University Press, Softback with plastic cover, 224 pp. £17.95. ISBN 978-0-691-15832-7.

This latest offering in a comprehensive list of natural history WILDGuides follows that of the ground breaking 'Britain's Hoverflies'. This publication is obviously aimed at the current army of butterfly and photography enthusiasts who inevitably encounter many species of moths during their activities and quite rightly wish to identify them. The statement on the back cover that this guide "will help you identify any of the day-flying moths found in Britain and Ireland" would seem somewhat

optimistic as apart from the moths that actually only fly by day it also attempts to identify a selection of species that could well be disturbed from cover and this can by definition only be subjective.

There are 155 individual species accounts with 320 photographs of moths in their natural settings. The book is well produced with generally very good photographs and is in addition packed with constructive information and is the perfect size for a field guide.

Preliminary chapters include Moth biology, Naming and identifying moths and where to look and Gardening for moths. I am not sure if we need to be told the difference between butterflies and moths and what is a day flying moth but perhaps so! The species accounts are preceded by a useful section which explains the English and Scientific Names, B & F – Bradley & Fletcher reference number, Legal/Conservation Status, Status in Britain and Ireland, Where found, Dates when flying, Larval foodplants, Similar species and Distribution maps. Also included is forewing length, this being essential in a photographic guide where relative size can only be indicative and to a certain extent this is recognised by a chart on the inside cover.

The species accounts cover the main families of moths including a few micros; the selection of any of these species can, of course, only be subjective and a matter of opinion.

The authors obviously have a fetish for the Sesiidae (Clearwings), as all the British species are included including *Paranthrene tabaniformis* (Dusky Clearwing), which whilst currently thought extinct is I agree certainly worth keeping an eye open for. In my limited experience the majority of clearwing species are unlikely to be seen by day without the use of pheromone lures, but this could no doubt be put down to my lack of field craft.

The inclusion of some other species can perhaps be criticised; are we likely to encounter *Eriopygodes imbecilla* (Silurian), *Zygaena viciae* (New Forest Burnet) or *Z. exulans* (Scotch or Mountain Burnet)? Probably not.

The micros inevitably can only be treated superficially, but the text gives a good idea of the complexity of the group, with English vernacular names being included in accordance with current convention.

The book concludes with extremely comprehensive advice on Conservation, Legislation, Recording and Monitoring and Further Reading which is invaluable. Whilst this publication is unlikely to figure on the "must have" list of the experienced, dyed-in-the-wool lepidopterist, anything which introduces the diurnal butterfly watcher to the wider nocturnal world of the moth enthusiast can only be applauded. It is a well-produced, informative guide, worthy of the series and certainly on this basis this reviewer wishes it every success.

JOHN PHILLIPS

SOCIETY NEWS

New members of the Society

Now that we no longer hold regular formal indoor meetings of the Society, the election of members to the Society is undertaken by Council at committee meetings. The following new members have joined the Society since the previous announcement:

Mr M. Ball of Driffield; Miss S. E. J. Broyles of Reading, Berkshire; Mrs R. M. Bull of Reading, Berkshire; Mr P. F. Whitehead of Pershore, Worcestershire; Mr. G. Redford of Newport Pagnell, Bucks; Miss J. E. R. Righton of Great Yarmouth, Norfolk; Dr J. R. Clough of Maidenhead, Berkshire; Mr I. J. Hill of East Lulworth, Dorset; Mr L. Davranogiou of Oxford; Miss V. Burton of Waterlooville, Hampshire; Mr J. M. Maskell of Worthing, Sussex; Mr Simon Springate of Gillingham, Kent; Mr C. Bates of Wednesbury, West Midlands; Mr J. Bebbington of Langport, Somerset; Miss C. M. Watkins of Longhope, Gloucestershire; Miss G. L. Brock of Enfield, Middlesex; Mr I. M. Barton of Stretham, Cambridgeshire; Miss B. P. J. Greenfield of Swansea; Mr H. Honey of Ipswich, Suffolk; Mr T. J. Tams of Tynemouth; Mr P. Birbeck of Preesall, Lancashire; Mr A. Hatt of Little Hallingbury, Essex; Mr R. J. Massy of Swansea, Glamorgan; Miss S. C. Hewins of the Isle of Man; Mr T. Parkes of Shrewsbury, Shropshire; Mr A. Wakefield of Bristol; Dr C. Hassall of Leeds; Mrs C. J. McEwan of Reading, Berkshire; Mr D. Stewart of Westleton, Suffolk; Mr J. R. Wheeler of Upwell, Norfolk; Dr D. Hubble of Eastleigh, Hampshire; Mr Zestin Soh of London; Dr A. M. J. Skinner of Sandy, Bedfordshire; Mr Sam Jones of Hatfield, Hertfordshire; Mr R. P. Hammon of Nunnington, N. Yorkshire; Mr R. Humble of Chenay le Chatel, France; Dr Caroline Uff of Craven Arms, Shropshire; Mr M. S. Taylor of Swindon, Wiltshire; Miss S. Anderson of Reading, Berkshire; Ms Beulah H. Garner of the Natural History Museum, London; Mr I. M. Barton of Stretham, Cambridgeshire; Mr P. A. Verdon of London; Miss N. M. Ricks of Bristol; Mr C. Perl of Hainault, Essex; Miss N. Kay of North Cheam, Surrey; Mr R. A. Watson of Hollesley, Suffolk.

THE SOCIETY'S PUBLIC LIABILITY INSURANCE

In 1997 the Society extended its third party liability insurance for cover in respect of official Society events to include field work carried out by members as part of their personal activities. It was expected that this would cover the insurance obligations, which accompany applications for collecting and recording permits in many cases.

The Society has received a number of queries regarding the scope of the cover provided and this notice will hopefully clarify the position.

At events arranged by the Society and its sister organisations, Dipterists' Forum, BMIG, and BWARS, public liability insurance is in place which covers injury and damage to third parties arising from the activities of members and guests. Events include both field meetings and indoor events such as workshops and exhibitions. The cover provided is £5,000,000. It is important that permits for field meetings are issued in the name of the Society, or sister organisation, or to an individual on behalf of the Society, not in the name of the leader of the meeting.

The Society's insurance policy also provides £5,000,000 of public liability insurance to individual members of the Society and sister organisations, in respect of their own field work and entomological research which is not part of a Society activity, providing this is undertaken in the United Kingdom and is not carried out with a view to financial reward.

Members who are contemplating carrying out field work on a paid basis are specifically excluded from this cover. We have now procured an arrangement by which such members can approach our brokers directly to obtain individual third party liability cover under our policy. This will incur the payment of an additional premium by the member concerned. We understand this will result in a very marked saving compared with obtaining this cover through a fresh policy.

We must emphasise that the cover referred to above is Public Liability Insurance and does not include Professional Indemnity, for which separate arrangements have to be made.

The Society's insurance policy number is,

Royal Insurance H2/RKE274258-7.

Our brokers are,

Lansdowne Woodward
Princes Court
Ferndown
Dorset
BH22 9JG
(Tel. 01202 874989)
www.lansdowne-woodward.co.uk



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